TECHNOLOGY DEPT.

ROADS AND STREETS

JUNE 1944

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JUL 6 1944
DETROIT

The beginning of a new road on New Guinea

U. S. SIGNAL CORPS PHOTOGRAPH

This U. S. Signal Corps photograph shows a "Caterpillar" Diesel Tractor and LeTourneau Carryall Scraper stripping kuni grass in preparation for a new road in New Guinea, South Pacific.

Wherever American fighting forces are operating, American construction battalions follow. Thousands of American construction machines are engaged in this work — the great majority equipped with Timken Tapered Roller Bearings, as are the two units shown in the photograph. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TAPERED ROLLER BEARINGS
5TH WAR LOAN
"BUY MORE THAN BEFORE IN THE 5TH WAR LOAN"

Speaking of Speeds

ADAMS MOTOR GRADERS *Have* THEM

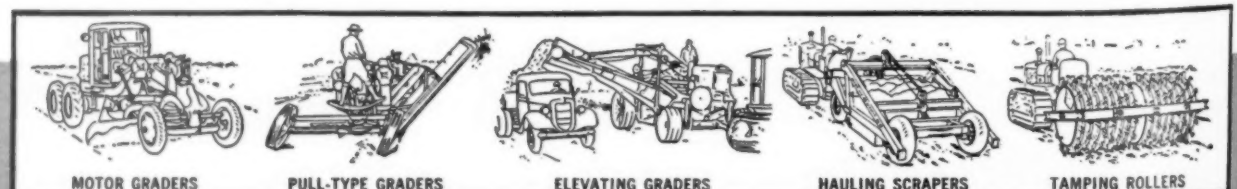
One of a series of ads on Adams motor grader features

AVAILABLE working and travel speeds have a lot to do with what you can accomplish with a motor grader in a day whether it be on construction work, maintenance or snow plowing . . . First, you want a motor grader that will travel to the job quickly. Adams Motor Graders have high travel speeds which cut down travel time . . . When you get on the job you want to make each cut at the fastest practical speed. Adams wide and flexible range of working speeds permits you to get the fastest practical speed for each cut to be made.

On surface maintenance Adams rigidity and balanced weight distribution permit maintaining at speeds higher than satisfactory with most machines. The grader pictured above is maintaining crushed stone roads at 5 to 6 m.p.h. . . . On all work, from bank to bank, Adams ease and economy of operation and quick adaptability to all kinds of cuts make Adams Motor Graders your best buy—always. Talk them over with your local Adams dealer—and use his services in keeping your present equipment rolling.

J. D. ADAMS COMPANY • INDIANAPOLIS, IND.

At war's end we'll need many new roads and many jobs for returning service men. Plan post war projects now and meet both needs.



MOTOR GRADERS | PULL-TYPE GRADERS | ELEVATING GRADERS | HAULING SCRAPERS | TAMPING ROLLERS

ADAMS

☆ ROAD-BUILDING AND ☆
EARTH-MOVING EQUIPMENT

For superior

lifting power

PURPLE STRAND WIRE ROPE

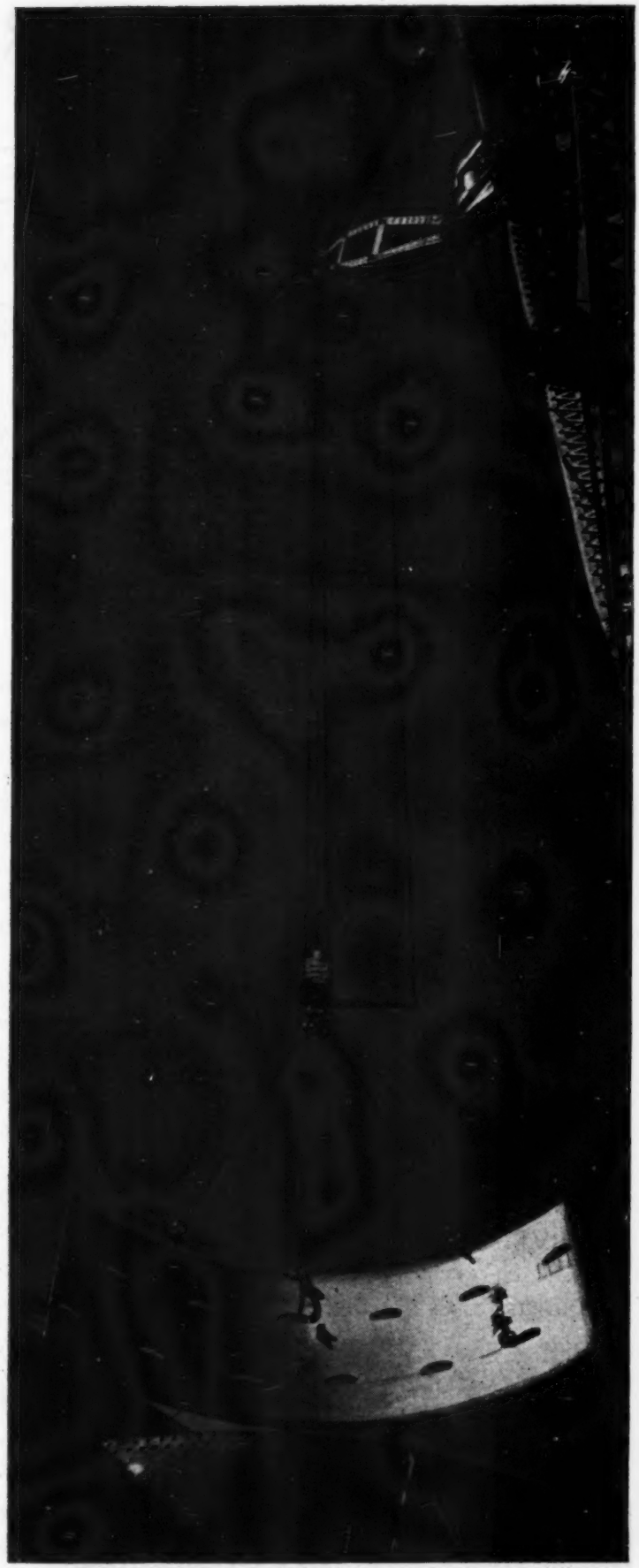
Superior lifting power—and plenty of reserve strength—is what's needed in construction jobs like this one, where giant cranes waft tons of steel through the air.

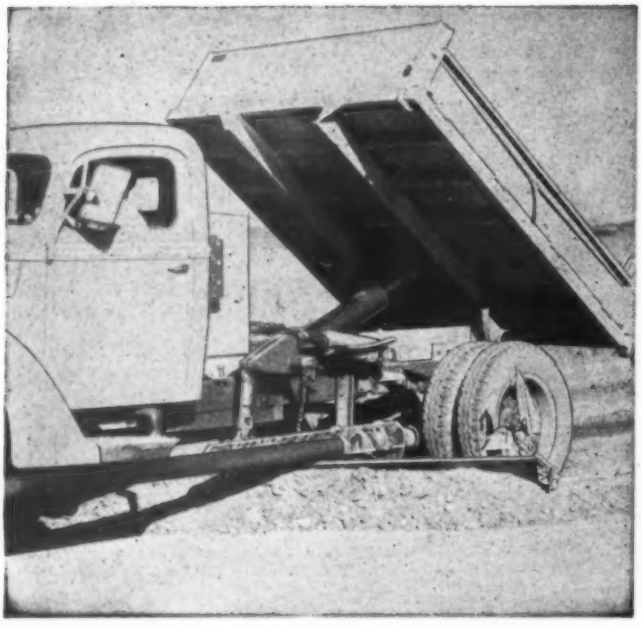
Lifting power is what Purple Strand has in abundance. This top-quality Bethlehem wire rope is the product of more than fifty years' experience in wire-rope manufacture. It is manufactured under close metallurgical control from blast furnace to stranding machine.

"Purple Strand" means that the rope is made of Improved Plow Steel—the huskiest steel used in any wire rope. For greatest durability and ease of handling, specify not only Purple Strand but "Form-Set"—which means that the wire rope is preformed rope, given its helical shape both in the individual wires and in the strands. Unlike ordinary rope, whose wires contain pent-up stresses and are possessed with a permanent urge to straighten themselves out, preformed rope is stable and relaxed, more resistant to bending fatigue, and much easier to spool and handle.

Make a note to order Form-Set Purple Strand Rope. But order it, please, as far in advance as possible, so that you'll be sure to have it when you need it.

★ ★ ★ BETHLEHEM STEEL ★ ★ ★





(YOUR TRUCK) + (ST. PAUL PATROL) = GOOD ROADS

Any four wheel drive truck makes a speedy, powerful road maintainer when combined with the

ST. PAUL HYDRAULIC TRUCK PATROL

Cab controls give operator the greatest speed in changing blade positions. Downward pressure on the moldboard is applied through two hydraulic rams. Cutting smoothness is assured by St. Paul's patented LEVELIZER.

Normal uses of truck are unimpaired.

For detailed literature and specifications please write the factory.

ST. PAUL HYDRAULIC HOIST COMPANY
2207 UNIVERSITY AVENUE S. E.
MINNEAPOLIS 14, MINNESOTA

ROADS AND STREETS

Vol. 87, No. 6 June, 1944

CCA

A magazine devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; and to the construction and maintenance of airports.

WITH ROADS AND STREETS HAVE BEEN COMBINED GOOD ROADS MAGAZINE AND ENGINEERING & CONTRACTING

HALBERT P. GILLETTE, President; EDWARD S. GILLETTE, Publisher; HAROLD J. McKEEVER, Editor; CHARLES T. MURRAY, Managing Editor; JOHN C. BLACK, Field Editor; LT. COL. V. J. BROWN, Publishing Director (Absent on Military Duty); H. J. CONWAY, Advertising Editor; L. R. VICKERS, Promotional Director.

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4 MOTO-CRANES

TEAM-UP TO ERECT LONGEST WOOD ROOF TRUSSES EVER BUILT

USING 4 Moto-Cranes to raise thirty-one 200 ft. wood roof trusses on the new Ryan Aeronautical Final Assembly Building in San Diego, is a liftable idea submitted by R. E. Hazard & Sons, owners of 12 Lorains.

This job was not so much a matter of weight as one of mobility and accurate boom control. Equal distribution of the load had to be maintained to avoid any distortion or mistreatment of the arches while maneuvering each truss into the heel plate positions—an unusual operation, yet typical of the hundreds of varied jobs Moto-Cranes are performing daily.

Completely mechanized, Moto-Cranes are mounted on 10 rubber tires that cushion as well as speed their travel between jobs—are sure-footed and steady on off-the-road jobs, crawl along at a snail's pace or speed up to 35 M.P.H., and jockey into working position as easily as parking your car.

If mobility and maneuverability are essential on your material handling operations, you'll find it mighty profitable to apply Moto-Crane performance on your postwar jobs. See your Lorain distributor for details.

THE THEW SHOVEL COMPANY
LORAIN, OHIO

Ryan Aeronautical Company Photo

No job too small... No job too big... or tough, for a **MOTO-CRANE**

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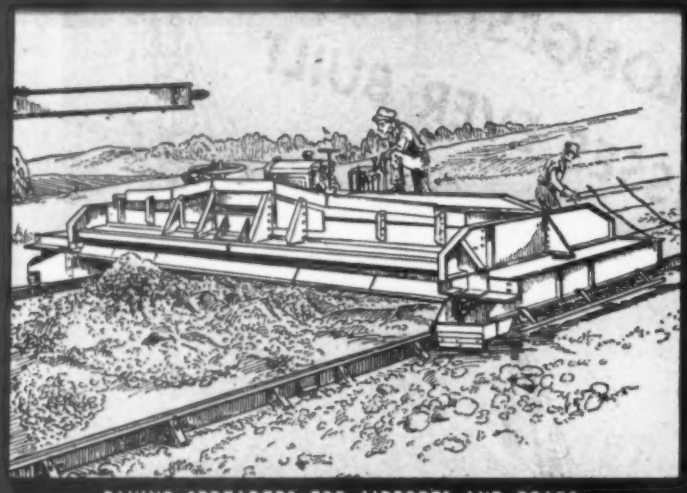
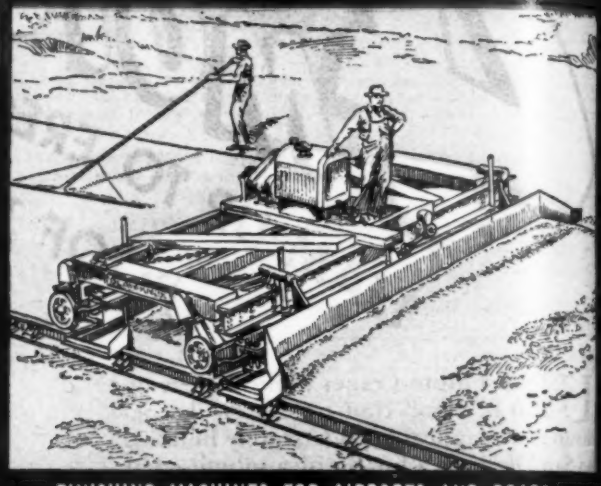
CRANES • SHOVELS • DRAGLINES • MOTO-CRANES

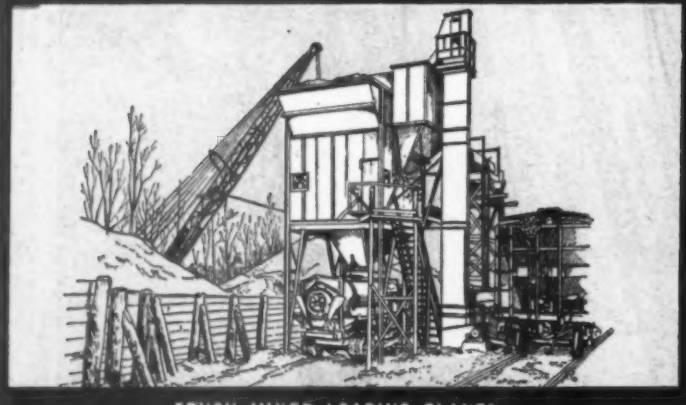
BLAW-KNOX *has the answers to*



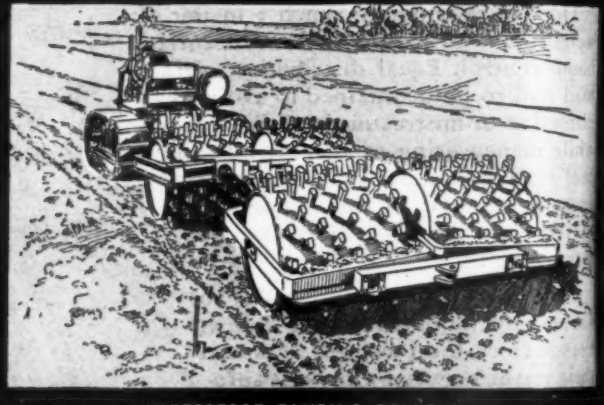
PAVING SPREADERS FOR AIRPORTS AND ROADS



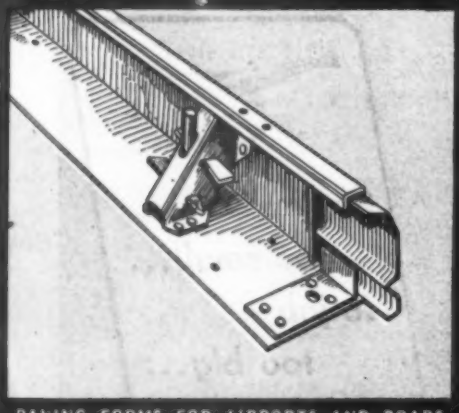
FINISHING MACHINES FOR AIRPORTS AND ROADS



TRUCK MIXER LOADING PLANTS

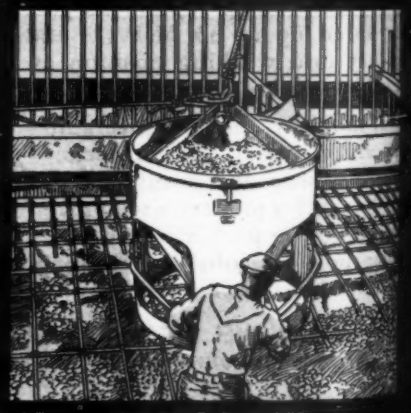


SHEEPSFOOT TAMPING ROLLERS



PAVING FORMS FOR AIRPORTS AND ROADS

CLAMSHELL BUCKETS



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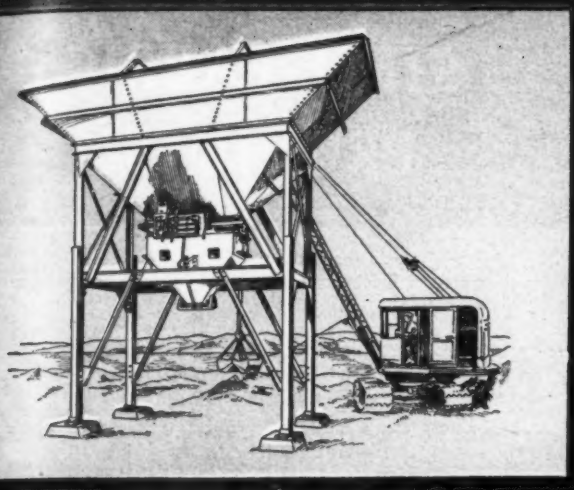
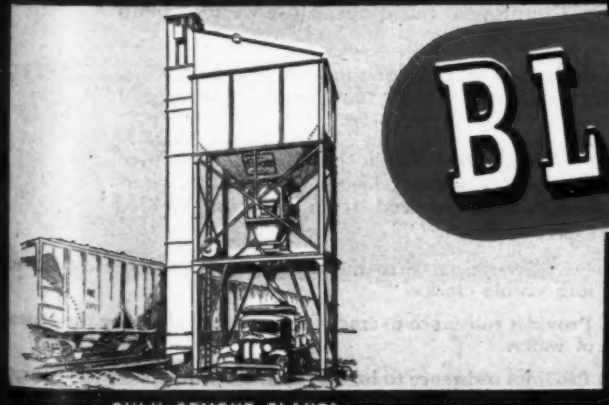


AGGREGATE BATCHING PLANTS

STEEL FORMS
FOR GENERAL CONCRETE CONSTRUCTION



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That unbeatable combination of *correct design, rugged construction* and *assured performance* has made Blaw-Knox equipment first choice of construction men who have a reputation for getting things done in a hurry...You'll find this trouble-free equipment hard at work building roads, airports and general concrete construction all over the world.

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NEW FOUNDLAND
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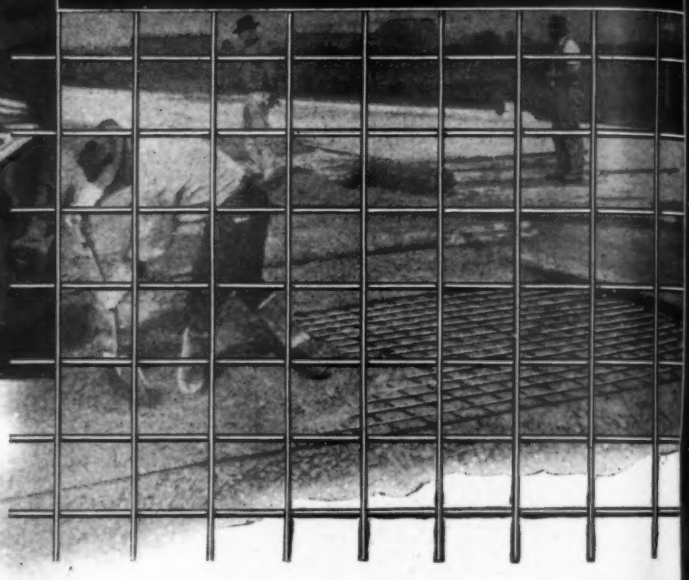
Concrete Highways, too, need reinforcing such as

TRUSCON WELDED STEEL FABRIC PROVIDES!



Steel for Roads that Endure!

With relation to the above bomb-shattered structure in Italy, the Saturday Evening Post says in a January 29, 1944 article: "Palermo had few steel-reinforced buildings. Most were of plain masonry, highly vulnerable to aerial bombing."

The same principles of destruction apply to the design of our American concrete highways. *Where there is no steel reinforcement there is high vulnerability to the shattering effects of heavy traffic and natural forces!*

For many years, concrete reinforced with Truscon Welded Steel Fabric has been an accepted and proved formula for road permanence. Engineers and designers know by research, practice and experience, that the following advantages can be secured from Truscon Welded Steel Fabric Reinforcement:

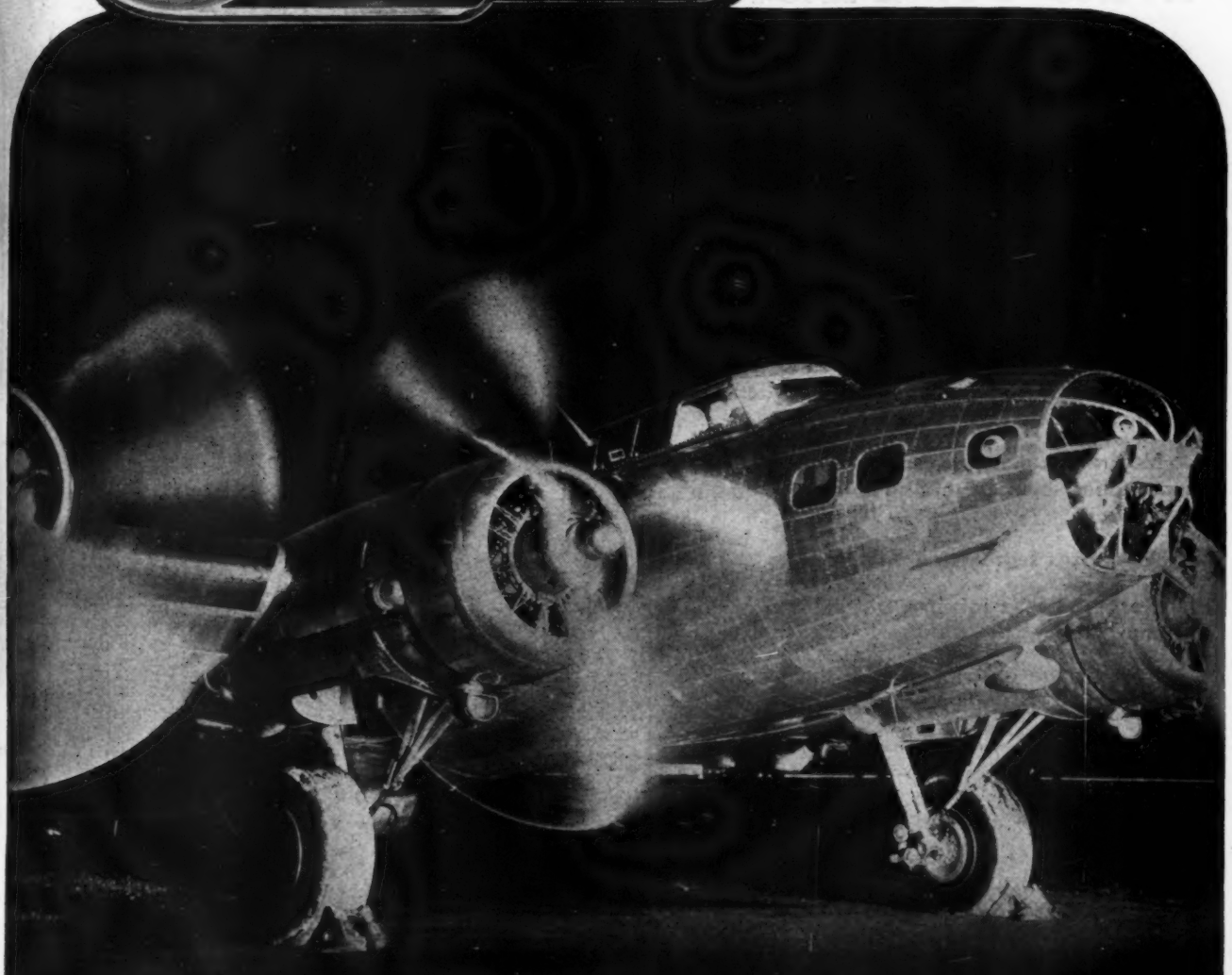
1. Provides resistance to cracking due to shrinkage of concrete during setting period.
2. Provides tensile strength necessary to resist subgrade friction caused by expansion and contraction of the concrete slab due to temperature changes.
3. Provides increased resistance to cracking of concrete due to warping under load.
4. Provides resistance to the development of microscopic cracks into visible cracks.
5. Provides resistance to cracks opening and allowing the entrance of water.
6. Provides resistance to broken ends of slabs separating at a crack.
7. Decreases spalling and progressive disintegration of the concrete.

When you plan roads, plan them well. Use structural designs that have been proved the most economical, durable and serviceable in the *long run*. Use Truscon Welded Steel Fabric with other associated Truscon roadbuilding products, and assure lasting prestige for you and more permanent highways for the communities you serve.

TRUSCON
Steel Company
YOUNGSTOWN 1, OHIO

SUBSIDIARY OF REPUBLIC STEEL CORPORATION

AIR PLUS JAEGER COMPRESSOR



We are producing for Uncle Sam today the compressor you'll demand tomorrow . . . built to the micro-precision of fine aircraft motors

Courtesy AVIATION

"AIR PLUS" Jaeger Vertical Two-Stage, Air-Cooled Compressors, in sizes from 60 to 500 ft., will be available to help you win your battles tomorrow.

THE JAEGER MACHINE CO., COLUMBUS 16, OHIO

JAEGER *Engineered* EQUIPMENT

"AIR-PLUS" 2-STAGE AIR-COOLED COMPRESSORS, 60 TO 500 FT.—"FLEET-FOOT" CRANE-LOADERS—"SURE PRIME" CENTRIFUGAL PUMPS—"SPEEDLINE" BUILDING MIXERS—"DUAL-MIX" TRUCK MIXERS—"JAEGER" HOISTING ENGINES AND TOWERS—"JAEGER-LAKEWOOD" PAVING EQUIPMENT

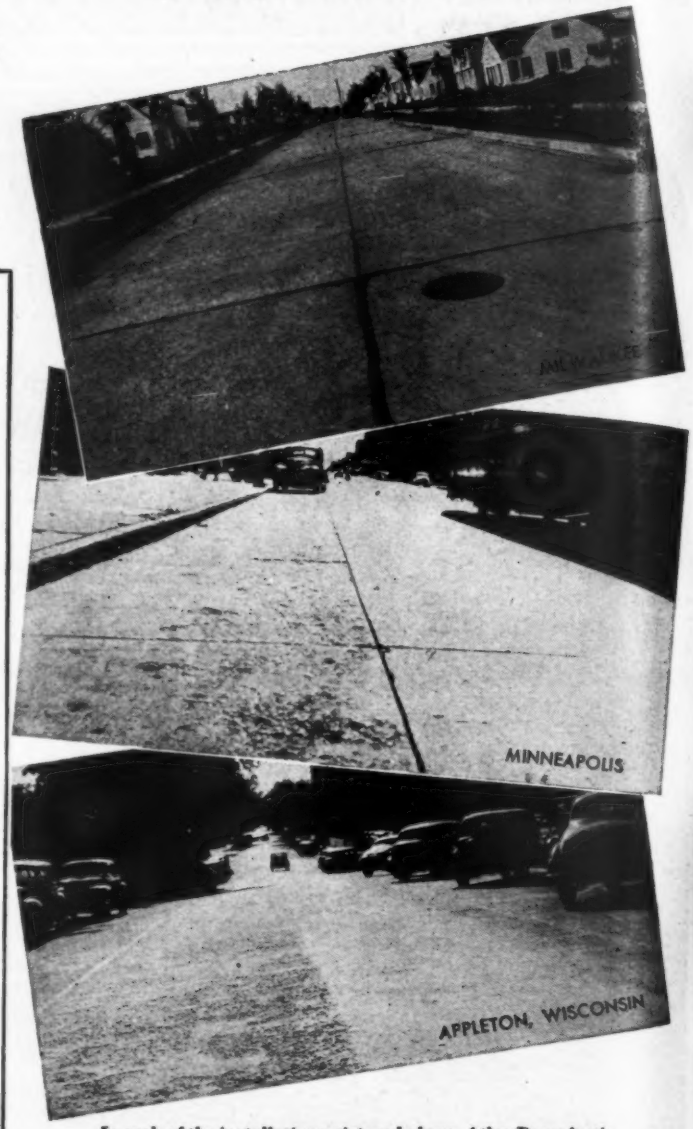
FOR SCALE-RESISTANT CONCRETE PAVING

ATLAS DURAPLASTIC*

Air-Entraining Portland Cement

QUICK FACTS

1. Complies with current Federal and ASTM specifications.
2. Provides the proper amount of entrained air by intergrinding with the cement the precise amount of air-entraining material needed for satisfactory field performance.
3. Makes concrete more workable, more plastic, more cohesive, more uniform and more durable throughout.
4. Minimizes segregation and bleeding.
5. Requires less mixing water for a given slump.
6. Fortifies the concrete against the effects of freezing and thawing weather.
7. Renders the concrete highly resistant to scaling due to action of de-icing salts.
8. Tends to reduce manipulation scale.
9. Produces concrete that dumps, spreads, screeds and finishes more easily.
10. Called DURAPLASTIC because it makes concrete more durable and more plastic.



In each of the installations pictured above, Atlas Duraplastic was used on the right lane; normal cement was used on the left lane. Note that in each case the left lane has scaled, but the right lane is practically scale-free after several winters of identical salt de-icing treatment.

MORE than three score paving installations in over a dozen states and cities have proved the advantages of this new cement. Its commercial announcement in 1943 followed more than five years of research and testing in the laboratory, in the manufacture of this cement, and on actual jobs. Some of these have now passed their fifth winter of salt de-icing applications and all are practically scale-free.

For further information on the use of Atlas Duraplastic, write to our Technical Service Bureau. Ask for reprints of articles from technical journals giving details of actual installations. Universal Atlas Cement Company (United States Steel Corporation Subsidiary), Chrysler Bldg., New York 17, N. Y.

• • •

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RS-D-6

ATLAS DURAPLASTIC CEMENT

A Universal Atlas Product

AMERICA IS *Built with Aggregate!*

Cedarapids

Built by IOWA

THE IOWA LINE

of Material Handling Equipment Includes

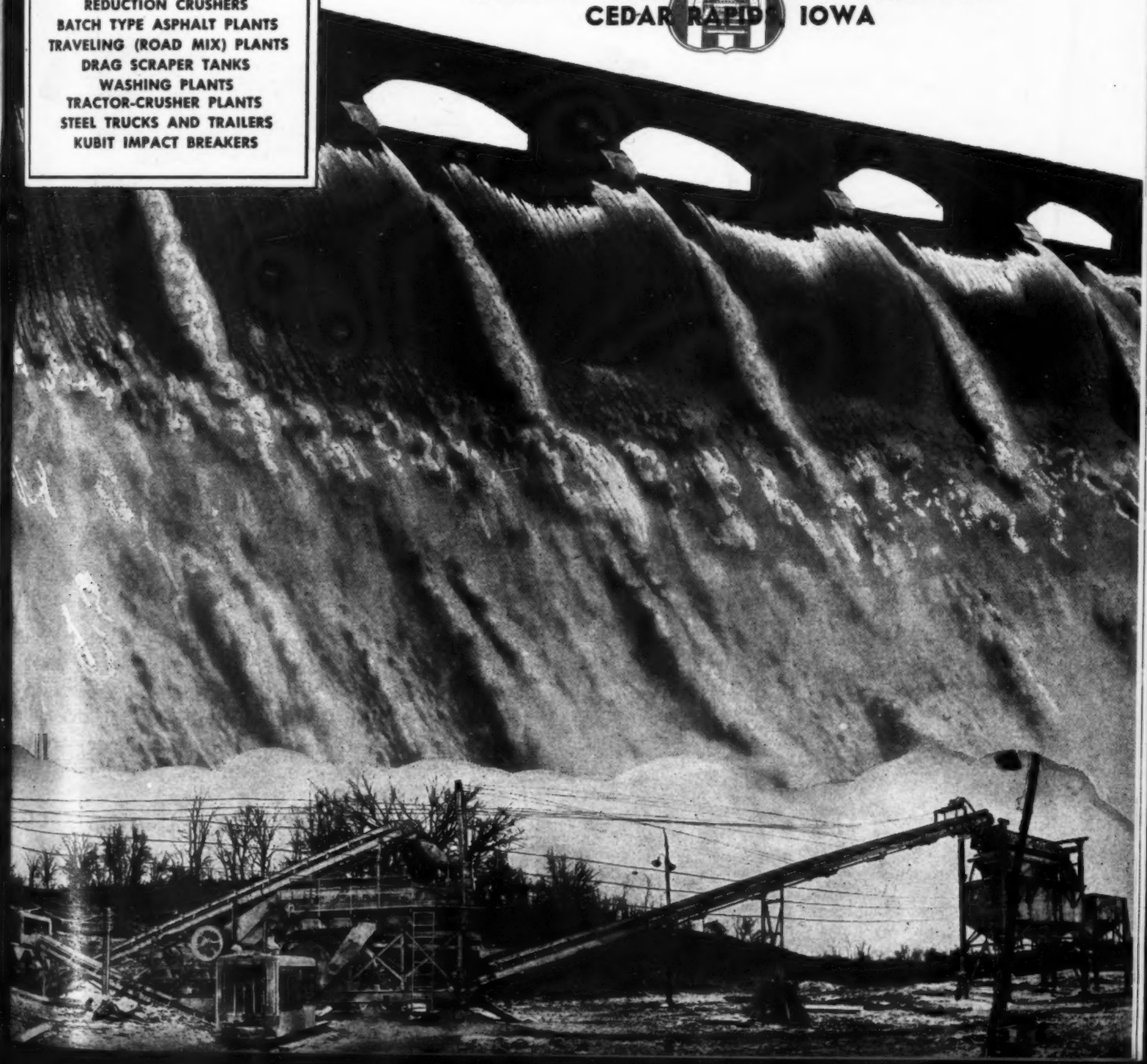
ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS — STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS
FEEDERS — TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

New Life for 350,000 more Americans

New power for new farms, new industries, villages and cities, water for more than a million thirsty acres—all this is made possible by 15,000,000 yards of aggregates which are the basic ingredients of mammoth Grand Coulee Dam. Even more fundamental, specially where the contractor is concerned, is the cost of producing aggregates for dams like this, or for highways, airports, industrial or residential building. The difference of even a few cents a ton, on the cost of producing that aggregate, may mean the difference between profit and loss or between getting the contract or not getting it.

Tomorrow's construction projects hinge on low cost aggregates! IOWA, devoted exclusively to the manufacture of Cedarapids equipment, will be more than ever Headquarters for aggregate producing equipment for the boom periods that lie ahead.

IOWA MANUFACTURING COMPANY
CEDAR RAPIDS, IOWA



OIL CONSERVATION
PAYS DOUBLE DIVIDENDS these days

Gasoline powers the attack

Do you drive ALONE? Do your employees drive ALONE? Cooperate with the current OPA campaign to "Share the ride."

Join a ride-sharing club yourself . . . form one for your employees or urge them to join one. It's a solemn obligation these days when the enemy is reeling and Allied forces are set for the knockout. EVERY GALLON COUNTS DOUBLE!

Your local War Price and Rationing Board has a procedure that will help you . . . if you want riders or if you want a ride. Get the information now. . . use your telephone.

IF YOU MUST DRIVE YOUR CAR *Share it*

Properly filtered oil saves oil... and engines

Keeping oil clean lowers oil consumption—reduces engine wear—assures better performance.

Check your oil filter regularly—on your automobile and on your industrial engines. Replace the refill cartridge when necessary . . . keep your oil PHYSICALLY, CHEMICALLY and VISIBLY clean at all times. There is a Briggs Clarifier for every oil filtration problem for every type internal combustion engine.

See the Briggs representative in your locality. Let him show you how Briggs Oil Clarifiers clean oil 3 TIMES—3 WAYS.

BRIGGS CLARIFIER COMPANY
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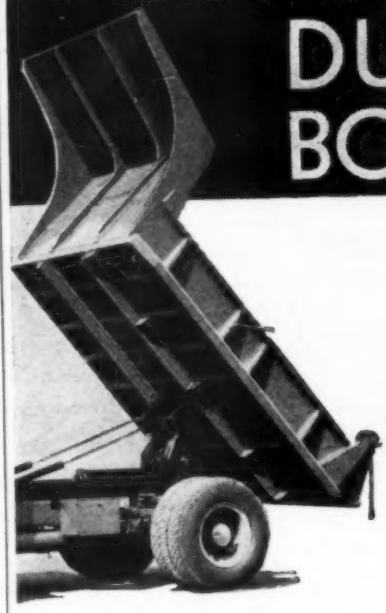
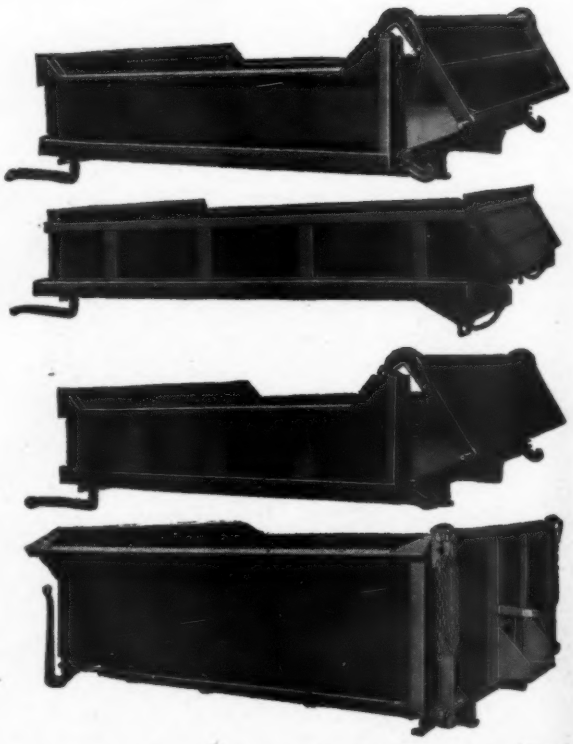
Representatives in Principal Cities

Briggs
PIONEERS IN MODERN OIL FILTRATION

PERFECTION DUMP BODIES



FOR ALL MAKES OF TRUCKS



Backed by a tradition of Leadership in values and continuously improved features for the advantage and profit of truck and commercial car users everywhere. Perfection Hoist and Body Models are made for all purposes and all sizes and makes of trucks.

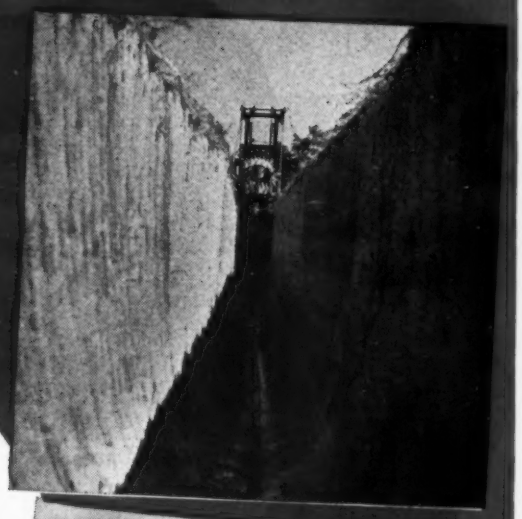
Write for bulletin and prices.

THE PERFECTION STEEL BODY CO.
GALION, OHIO

ARMY E NAVY
PERFECTION
TRUCK BODIES AND HOISTS

STOP

Those "Thieves" with Buckeye Trenchers!

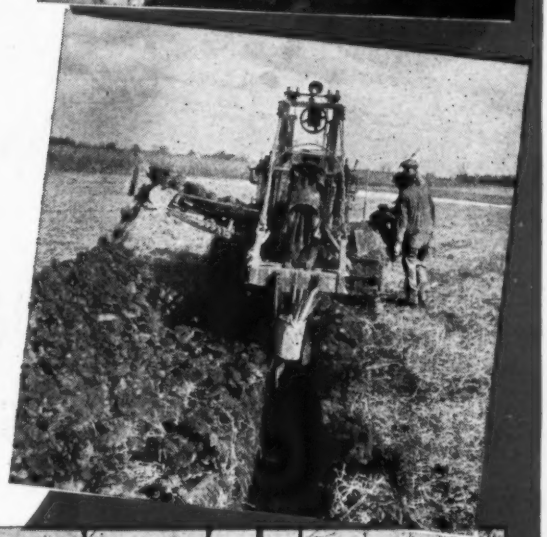


Every year erosion and oxidation needlessly take a tremendous toll of public and private property. Power, light and telephone lines placed underground escape the attacks of rain, ice and sun and are free from expansion and contraction stresses resulting from temperature changes.

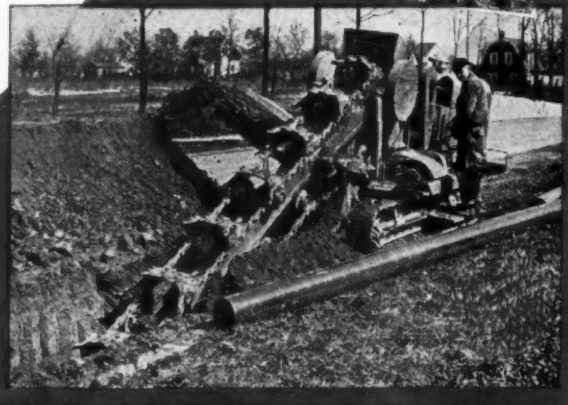
In addition, buried cables enhance the appearance of any community and eliminate a hazard to aviation.

Every spring hundreds of thousands of basements are flooded, destroying merchandise and visiting havoc on home owners; all of which could be eliminated by proper drainage. Many highways and streets are damaged in the same places year after year because of improper drainage.

There are limitless essential post-war trenching jobs awaiting the Buckeye trenchers to do them—jobs that will stop the costly deterioration of transmission lines and arrest the destruction of property. Jobs that will increase America's assets. Rugged, soundly engineered Buckeye trenchers can do the trenching faster, and at minimum cost. *Plan ahead*—ask for Trencher Catalog.



BUCKEYE TRACTION DITCHER CO.
FINDLAY, OHIO



Top: "Digging Wheel" Buckeye trenching for steam mains at a Naval Base. Center: Model 12 Buckeye trenching for telephone cable near airport. Above: Fast, compact "boom type" Model 410 digs trench for water main in Michigan. Left: Model 120 "boom type" Buckeye trenching for drainage, sewage, water, gas, steam and electric cable at new Veterans' Hospital, Hines, Illinois.

Built by **Buckeye** ✓

Convertible Shovels Road Wideners Trenchers
Spreaders R-B Power Finegraders Tractor Equipment

YOU WOULDN'T

TAPE THE FINGERS OF A *pianist*

LAY·SET-*Preformed* IS RELIEVED

Of course, this analogy is far-fetched, but it is still true that the wires and strands of non-preformed wire rope are virtually locked in position—under constant stress—uncomfortable—cranky. Being so, non-preformed cannot work so well, nor long, as Hazard LAY-SET, which is preformed at the mill and entirely relieved of internal torsional stresses and strains. LAY-SET Preformed wire rope gives you greater dollar value, requires no seizing when cut; it resists kinking and whipping; it is easier to splice and safer to handle. And, invariably, it wears longer.

Ever since Pearl Harbor, and even before, Hazard LAY-SET Preformed has been saving time and money for the Government, the Armed Forces, and the taxpayer.

Specify Hazard LAY-SET Preformed for all its built-in advantages.

HAZARD WIRE ROPE DIVISION • Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland, Tacoma

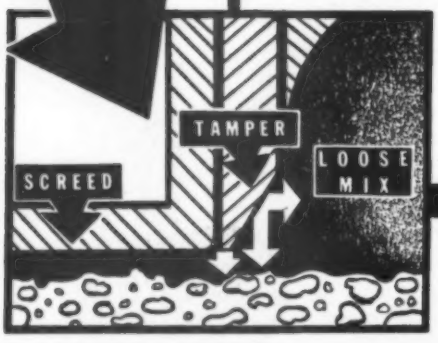
AMERICAN CHAIN & CABLE COMPANY, INC. • BRIDGEPORT • CONNECTICUT

HAZARD LAY·SET *Preformed* WIRE ROPE

Asphalt Tampers

Joe was an early model asphalt tamper. Wearing his heavy wooden shoes, Joe got out on the hot, steaming mat and pounded down the spots around manholes and gratings that had to have tamping while the mix was hot. His boss used to wisecrack that Joe knew asphalt from the ground up. That's why he's running a Barber-Greene Finisher today—Joe knows the value of tamping while the mix is hot.

Joe is tamping 1200 strokes a minute now. Tamping the mix hotter than he could walk on it, even with his wooden clogs, while it is in the best workable condition. The roller that follows Joe and his B-G Finisher adds about an eighth inch final compaction. And the depressions are full of compacted material, not struck off material that will compress under traffic and repeat depression on new surface.



The bevelled face of the tamping bar does the actual compacting. It pushes the material forward as well as down, forcing the hot mix into the voids and produces a dense mat. The travel of the tamper imparts a rolling movement to the loose mix in the spreading chamber which prevents any segregation of material. The follow-up screed is level with the bottom stroke of the tamper bar and adds its weight to compacting the mat.

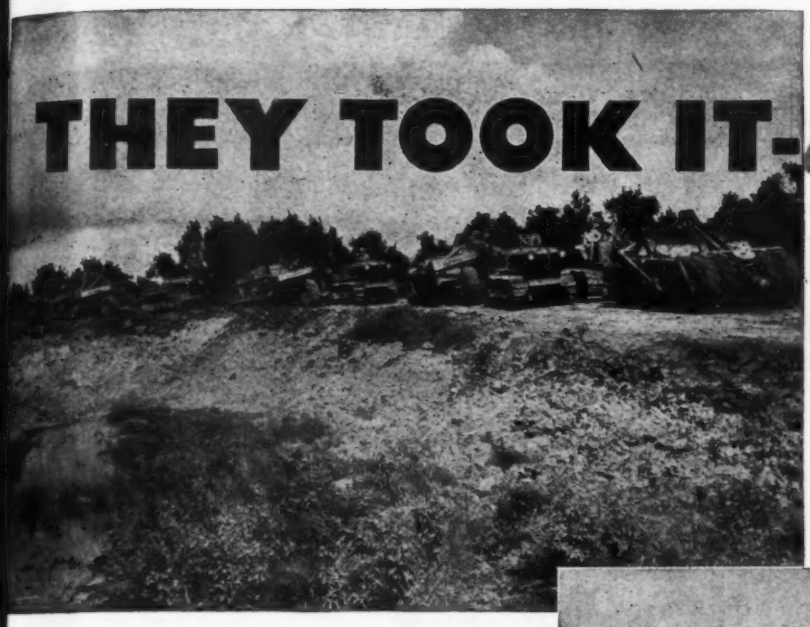
44-9

BARBER-GREENE

ARMY E NAVY

AURORA, ILL., U. S. A.

THEY TOOK IT—and Asked for More!



No let-up! The same 2-cycle Diesel tractors that hurried the giant defense projects here are under still more pressure constructing new, outlying bases and airfields. Hauling supplies from landing boats (below) is another one of their numerous jobs.

Their names may never be mentioned in history . . . but their deeds are carved out for all time.

Joe, Hank, Jack or Blackie—men you didn't want to lose, but whose work now makes you more proud of them than ever! You'd never guess when you "broke 'em in" on the bull-dozer and tractor-scraper outfits that they would soon use that training to help win this war.

Now they are "over there" somewhere . . . either with the combat forces or close behind. One of their biggest jobs is to convert bombed dumitories and dense, disease-ridden jungles into mammoth air and supply bases. One Seabee said, "Boy, I wouldn't take $5.00 a yard to move this dirt back in the states." But he and others are moving it . . . with remarkable speed and efficiency. They know the fate of our nation is riding on those 'dozer blades as much as on any other tool of war.

• • •

Many of the 2-cycle Diesel tractors our armed forces enlisted to carve out new bases, roads and airfields are the same units used to rush through the big ordnance jobs here. After long hours of tough service they were reconditioned and shipped to foreign shores to continue this fight for our free way of life.

When the time comes to put the big, proposed postwar construction program into action . . you will find 2-cycle Diesel tractors "in there pitching", taking everything and asking for more. Figure on them, too, for your postwar work!

This manual will save you time and money, extend tractor life, conserve critical materials.

2-CYCLE DIESEL OWNERS!

Get Your Copy Of Our Service Manual On The HD Series Of Tractors

Gives complete, detailed information on adjustments, service, maintenance and overhaul of 2-cycle Diesel tractors . . . profusely illustrated! Tells you what, when, how! Invaluable to every HD user to maintain the efficiency and lengthen the life of these tractors. Complete in every detail—344 pages, 576 illustrations! Price $1.50 Postpaid.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

2-CYCLE DIESEL TRACTORS

BUY WAR BONDS • SAVE WASTE PAPER • PLANT FOR VICTORY • TURN IN SCRAP METAL • BE A BLOOD DONOR • PAY ONLY CEILING PRICES

14 YEARS OF USE

Under All Operating Conditions

Recommends VICKERS HYDRAULIC POWER STEERING

Since 1930, the Vickers Hydraulic Power Steering System has been used on a wide variety of heavy-duty vehicles where "the going is really tough" . . . on road building machinery, fire fighting equipment, logging and ore trucks, buses, snow removal equipment, etc.

Effortless, positive and shockless steering can be provided for practically any vehicle by applying the Vickers Hydraulic System, which usually requires only a few minor changes in the existing hand steering mechanism. The driver supplies only enough energy through the steering wheel to control the hydraulic valve . . . a finger is sufficient. The hydraulic cylinder (booster) supplies the power to turn the front wheels so that they exactly follow the steering wheel movement, utilizing pressure from the engine-driven pump. Road shock thrusts are transmitted to the frame instead of to the steering gear.

Write for a copy of new Bulletin 44-30 which describes all the features of Vickers Hydraulic Power Steering.

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Application Engineering Offices: CHICAGO • CLEVELAND • DETROIT • LOS ANGELES • NEWARK • PHILADELPHIA
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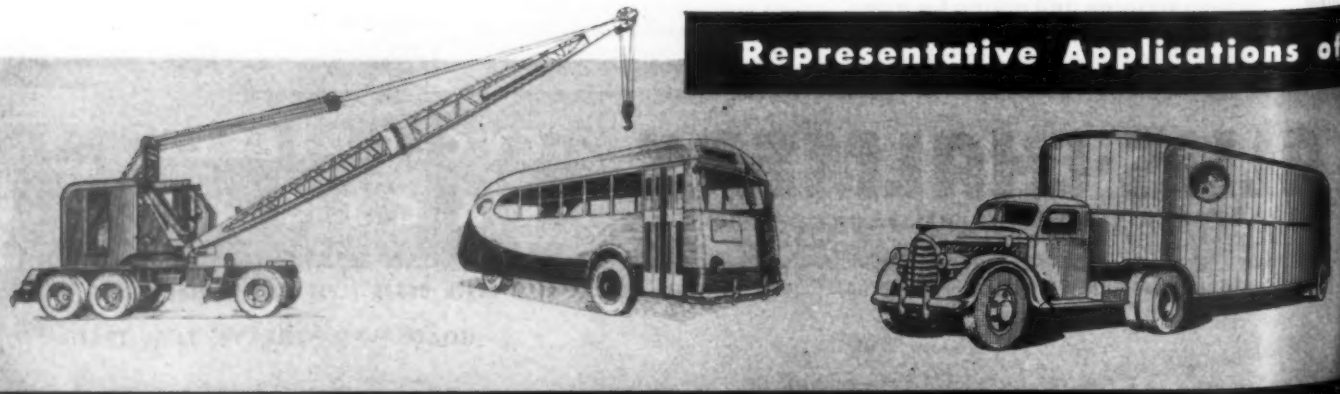
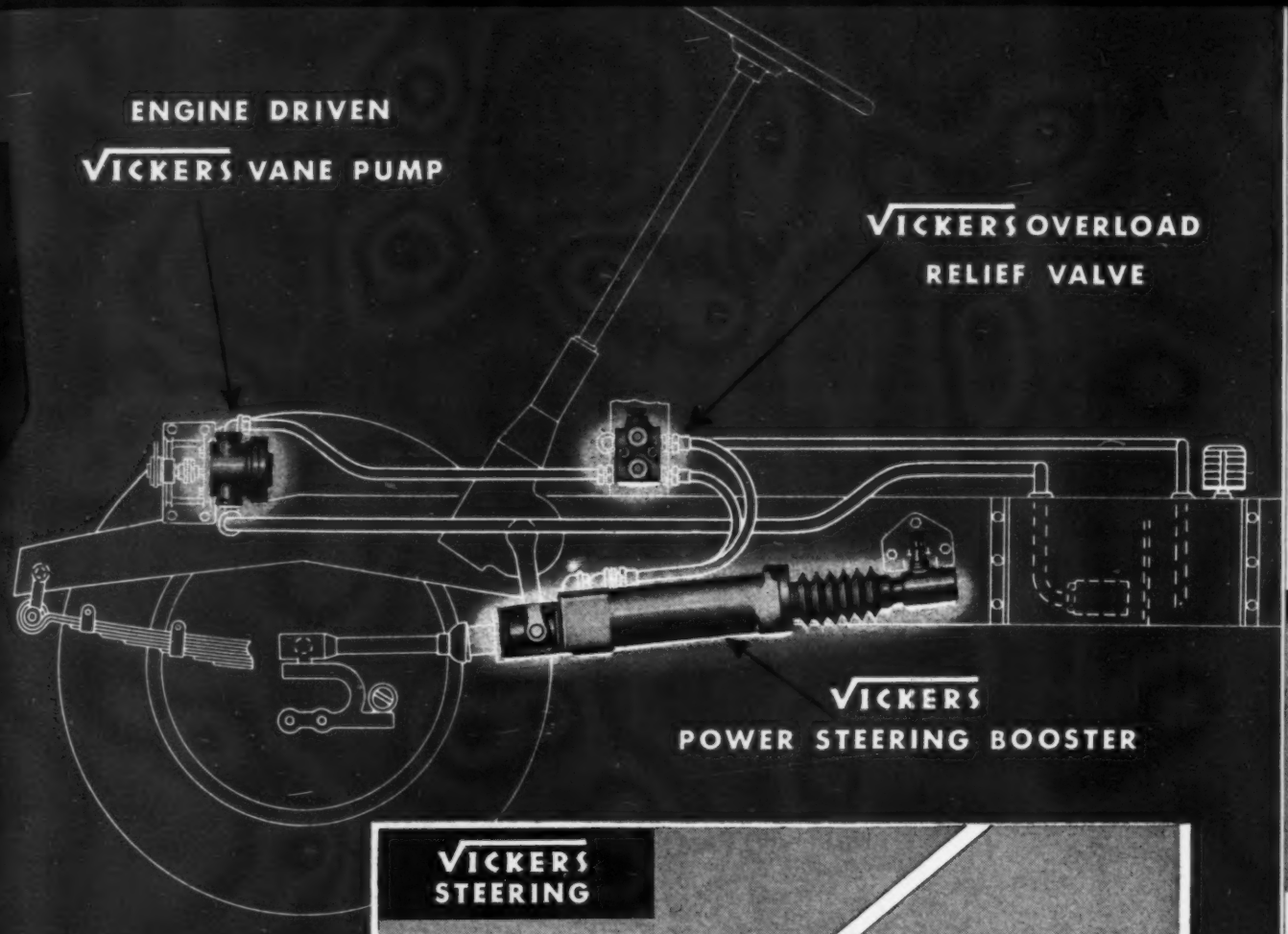
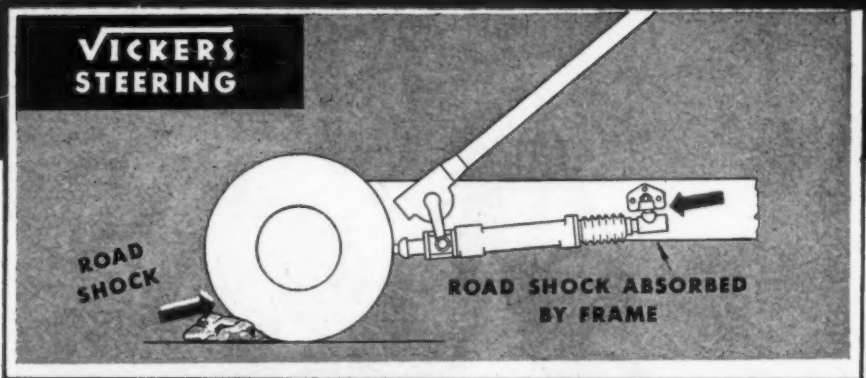
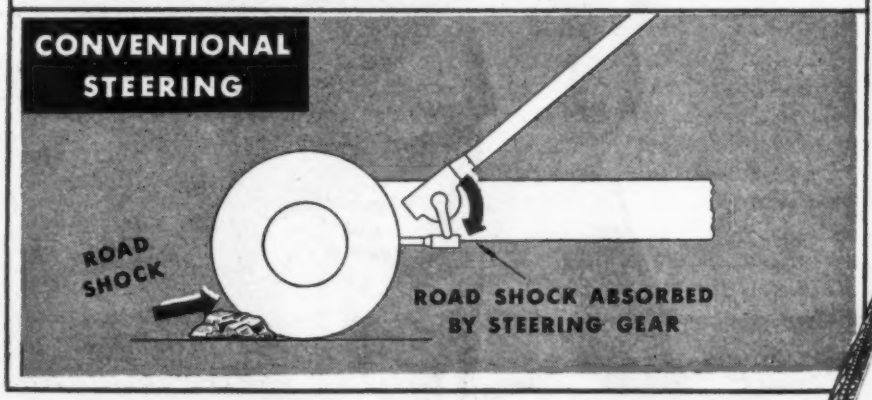
Representative Applications of





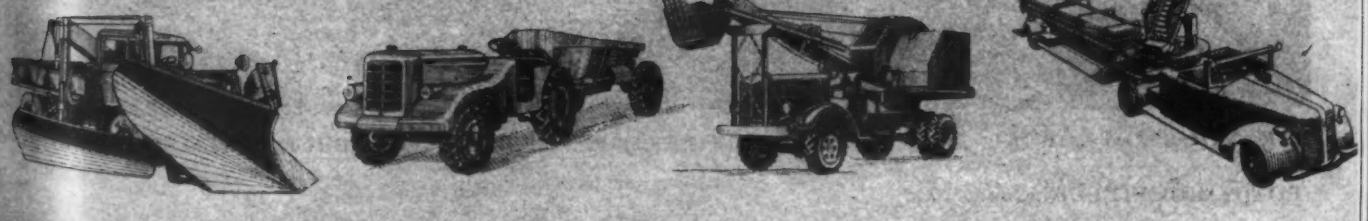




With Vickers Hydraulic Power Steering road shock thrusts are transmitted to the frame instead of to the steering gear.

Engineers and Builders of Oil Hydraulic Equipment Since 1921

VICKERS HYDRAULIC POWER STEERING



BACK OF EVERY ATTACK . . .

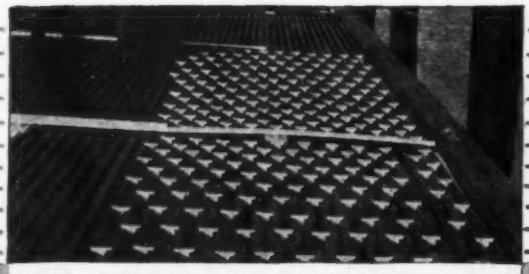
Preformed wire rope

Preformed wire rope gives sinews of steel to bulldozers that clear the way so jeeps, planes, and trucks can advance. Preformed is in the fight on practically every kind of mobile war machine.

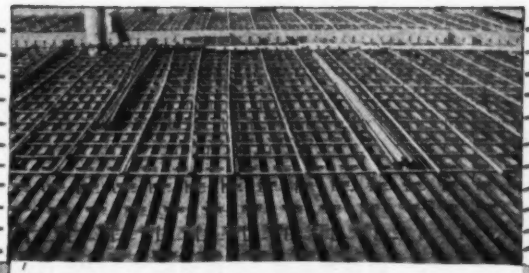
Men who use Preformed wire rope know that it outlasts and outworks ordinary wire rope. That it handles easier—speeds up operations—safeguards men and equipment.

In the past, Preformed has proved it is the wire rope for the tough peacetime jobs. Today, back of every attack, it is proving that it is the wire rope for the tough war jobs.

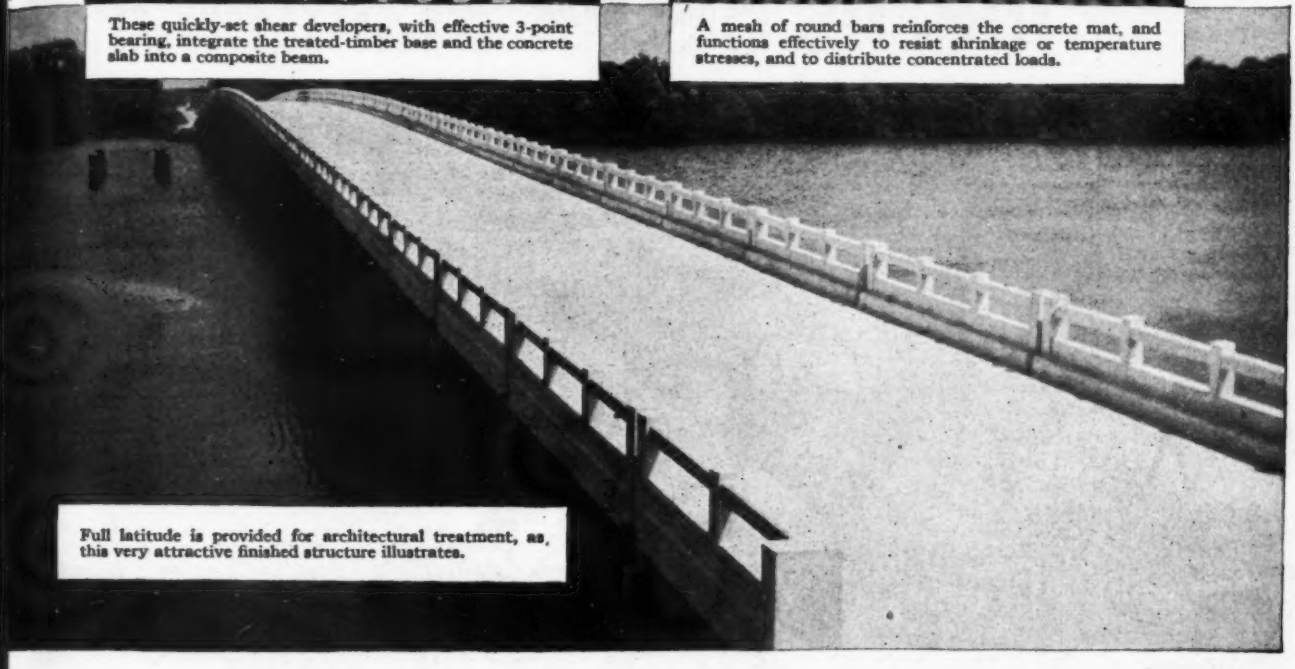
ASK YOUR OWN WIRE ROPE MANUFACTURER OR SUPPLIER FOR PREFORMED WIRE ROPE



These quickly-set shear developers, with effective 3-point bearing, integrate the treated-timber base and the concrete slab into a composite beam.



A mesh of round bars reinforces the concrete mat, and functions effectively to resist shrinkage or temperature stresses, and to distribute concentrated loads.



Full latitude is provided for architectural treatment, as, this very attractive finished structure illustrates.

In building for today . . . or designing for tomorrow . . .

COMPOSITE DECK BRIDGES can SAVE for you

Whether you're designing a bridge for immediate construction, or putting the plans on the shelf till 194? A. W. (after war), you'll find this modern, permanent, composite-deck will solve a lot of bridge problems for you.

No joist and stringer system is needed. The laminated base is made up of pressure-treated timber plank, with alternate pieces raised to form longitudinal grooves. Small steel shear developers are set in the wood, providing shear connection at the junction plane. This integrates the base and the concrete top into a single beam with an effective depth equal to the overall thickness. The concrete mat does double duty as part of the supporting medium and as a durable traffic surface.

In current construction, this design requires a minimum of critical metals. For post-war projects, it eliminates the possibility of long waits for materials, and permits utilization of a maximum of local labor. In both cases, owners and taxpayers are assured the greatest value per dollar invested. Pressure-treatment makes wood resistive to decay and insect attack. Experienced engineers accept it as a permanent construction material.

If you would like to know more about composite decks and their application to various types of bridges, docks, heavy duty floors, etc., we will gladly furnish details.

KOPPERS COMPANY • WOOD PRESERVING DIVISION

PITTSBURGH 19, PA.

KOPPERS

THE INDUSTRY THAT SERVES ALL INDUSTRY

CORRECT Lubrication means Better Maintenance

U. S. Signal Corps Photo

CORRECT lubrication makes for better maintenance by preventing excessive wear.

Sinclair TENOL-200 provides *correct* lubrication under heavy duty operation for Diesels, and Diesel-powered bulldozers, buckets, and shovels. Sinclair specialized oils and greases are highly efficient on all types of hard worked equipment.

Where operating conditions threaten excessive wear and overhaul shutdown there is a lubrication problem. Consult us about it.

(Write for "The Service Factor" — published periodically and devoted to the solution of lubricating problems.)

SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

NEW *Thor* RETAINER

. . . provides NEW OPERATING SPEED

Fully-enclosed to prevent clogging . . . to function smoothly for the life of the tool, the springs in this new Thor Retainer now give you longer, steady "cushioned" action on operations typical of the above—where the shock of removing the drill from a hole is absorbed.

WITH *Thor* ROCK DRILLS

Thor design scores again with an *exclusive* development to bring you *new operating speed* with Thor Rock Drills.

It is the new Thor "Spring Cushion" Steel Retainer which now *fully encloses* its springs to bring you these new *speed* advantages:

✔ Fully enclosed Thor springs *last longer . . . save you time and maintenance cost,* because they are protected from dirt and other particles to prevent clogging.

✔ Fully enclosed Thor springs *retain longer, steady "cushioning" action* because they are sealed at proper tension inside a steel cap that is part of an inherent retainer design preventing them from being overtightened by the operator or repairman.

✔ Fully enclosed Thor springs *help you work faster . . . longer* because this same principle of *steady tension* makes the spring-attached locking device easier to operate in removing the drill shank from the tool under operation.

For full information about these new, improved Thor Sinker Rock Drills write today for Catalog 42A.

Thor *Portable Pneumatic and Electric Tools*

INDEPENDENT PNEUMATIC TOOL COMPANY

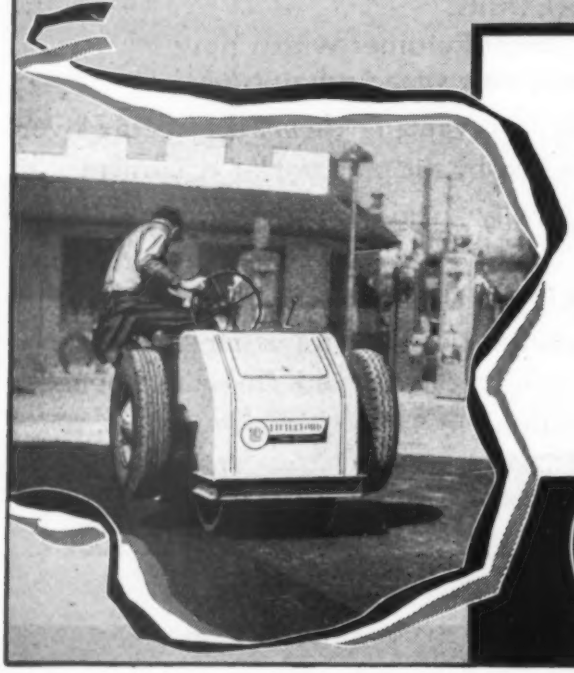
600 W. JACKSON BOULEVARD, CHICAGO, ILL.

Branches in Principal Cities

LITTLEFORD
Model No. 155

THE PORTABLE
TRAIL-O-ROLLER

CHANGES FROM TRAILING TO ROLLING POSITION IN 2 MINUTES TIME



When a Roller is needed on the job, no delays are necessary when a Trail-O-Roller is used. It can be taken right with the maintenance or construction crew hooked right behind a truck. The Trail-O-Roller is small, compact, yet gives as much compaction per inch of roller width as a 5-ton tandem roller. When it's ready to roll a road, highway, airport runway, parking area, etc., it can be changed from trailing to rolling position, or visa versa, by a hydraulic lift in 2 minutes' time.

For better roads, use the best equipment. Make plans to own a Littleford Trail-O-Roller.

BLACK TOP ROAD MAINTENANCE EQUIPMENT
LB
SINCE - 1900

LITTLEFORD

Littleford Bros., Inc.
454 E. Pearl St., Cincinnati 2, Ohio

This Clutch has a War Record

Performance under the severest conditions—that's the uniform comment of users of the Fawick Airflex Clutch.

This new, but tried and proved, clutch controls power by air pressure. It absorbs shocks and vibration, without moving parts, arms, levers or springs. Requires no adjustments, no lubrication—maintenance costs are very low. Operates as clutch, brake, slip-clutch or flexible coupling.

In Naval use, under combat conditions, the Fawick Airflex Clutch gives a degree of maneuverability and dependability never before known!

It has also proved itself for heavy duty drives in such industries as steel, paper, rubber, material handling, mining, petroleum, electric power, metal forming and dredging.

Consult us on your difficult clutch installations. Our engineering department will gladly advise with you.

12 IMPORTANT ADVANTAGES

1. Simple in design and operation.
2. Flexible control by air.
3. No adjustments or oiling—low maintenance.
4. Dampens vibration—absorbs shocks.
5. Corrects misalignment automatically.
6. Smooth starting—no jerks.
7. Runs cooler—uniform pressure.
8. Controls torque by air pressure.
9. Greater capacity—more compact.
10. Remote control by air valve.
11. Replaces couplings.
12. Acts as clutch, slip-clutch or brake.

FAWICK AIRFLEX COMPANY, INC.
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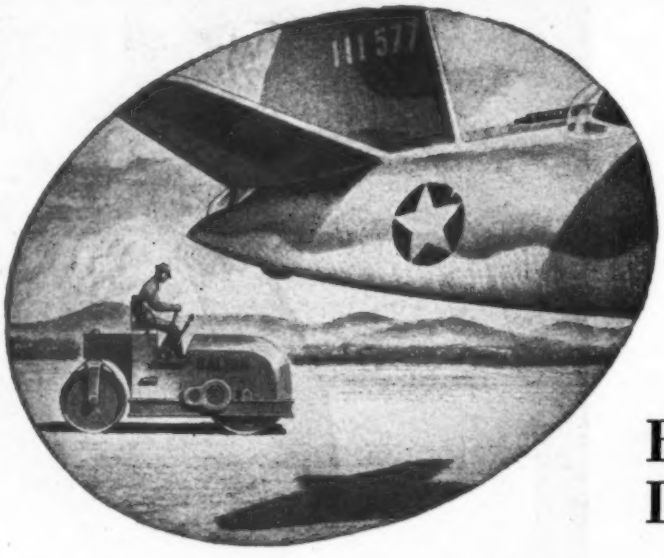
FAWICK *Airflex* CLUTCH

POWER CONTROLLED BY AIR

GALION ENGINEERS



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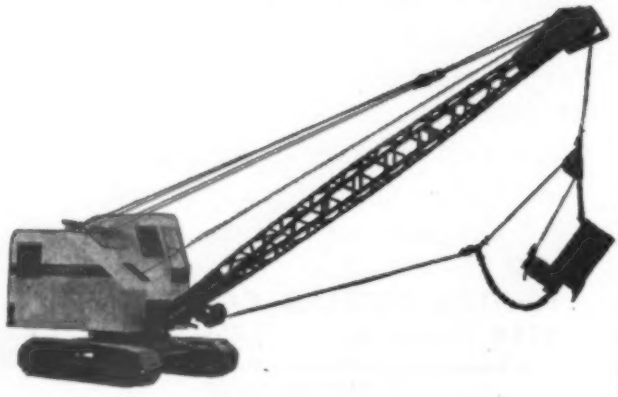
REALIZED LONG AGO

THAT ROAD MACHINERY would have to stand up under a lot of severe service—would have to meet high-speed requirements. Galion engineers built motor graders and road rollers accordingly. As a result, these Galion units are providing top performance on war-construction projects everywhere — helping to speed the final victory. Many road building programs will rely upon Galion after the war.

THE GALION IRON WORKS & MFG. CO.

Main Office and Works: Galion, Ohio

HANSON



CRANES

4 and 6 Ton Capacity
Crawler or Truck Mounted

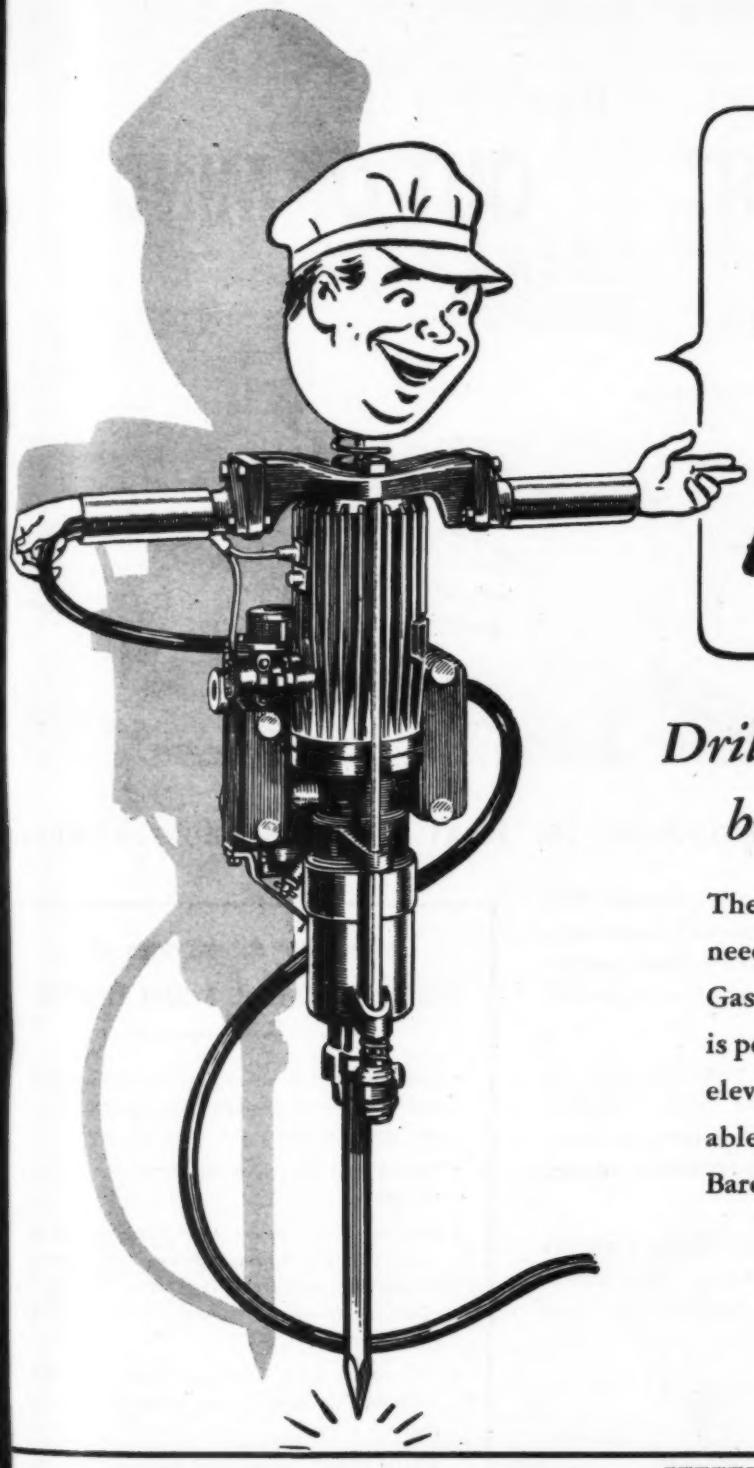
CONVERTIBLE TO
CRANE—DRAGLINE—CLAMSHELL
PILE DRIVER—TRENCH HOE—SHOVEL

Full Revolving—Lattice Welded Steel Boom—Balanced Design—Low Center of Gravity—Rugged—Flexible—Heavy Industrial Type Motor, Gasoline or Diesel.

Our entire factory facilities is being used for the production of Crawler Cranes for the U. S. Navy. However, all present Hanson equipment owners are assured that any order for repairs will receive our immediate attention and shipped promptly.

THE HANSON CLUTCH & MACHINERY CO.

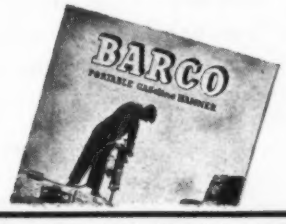
PHONE 417 **TIFFIN, OHIO**



"I MAKE LIGHT WORK OF HEAVY JOBS"

Drilling, digging, driving, breaking or tamping

The tougher the job the greater your need for a low-cost Barco Portable Gas Hammer. A self-contained unit, it is portable under any conditions. With eleven special tool attachments available, you can meet any job on the spot. Barco Manufacturing Company, Not Inc.



BARCO

PORTABLE GASOLINE HAMMERS

BARCO MANUFACTURING CO., NOT INC.
1815 Winnemac Ave., Chicago 40, Ill.

Gentlemen:

Without obligation on my part please send me a copy of the BARCO HAMMER BOOKLET.

Name_____

Street_____

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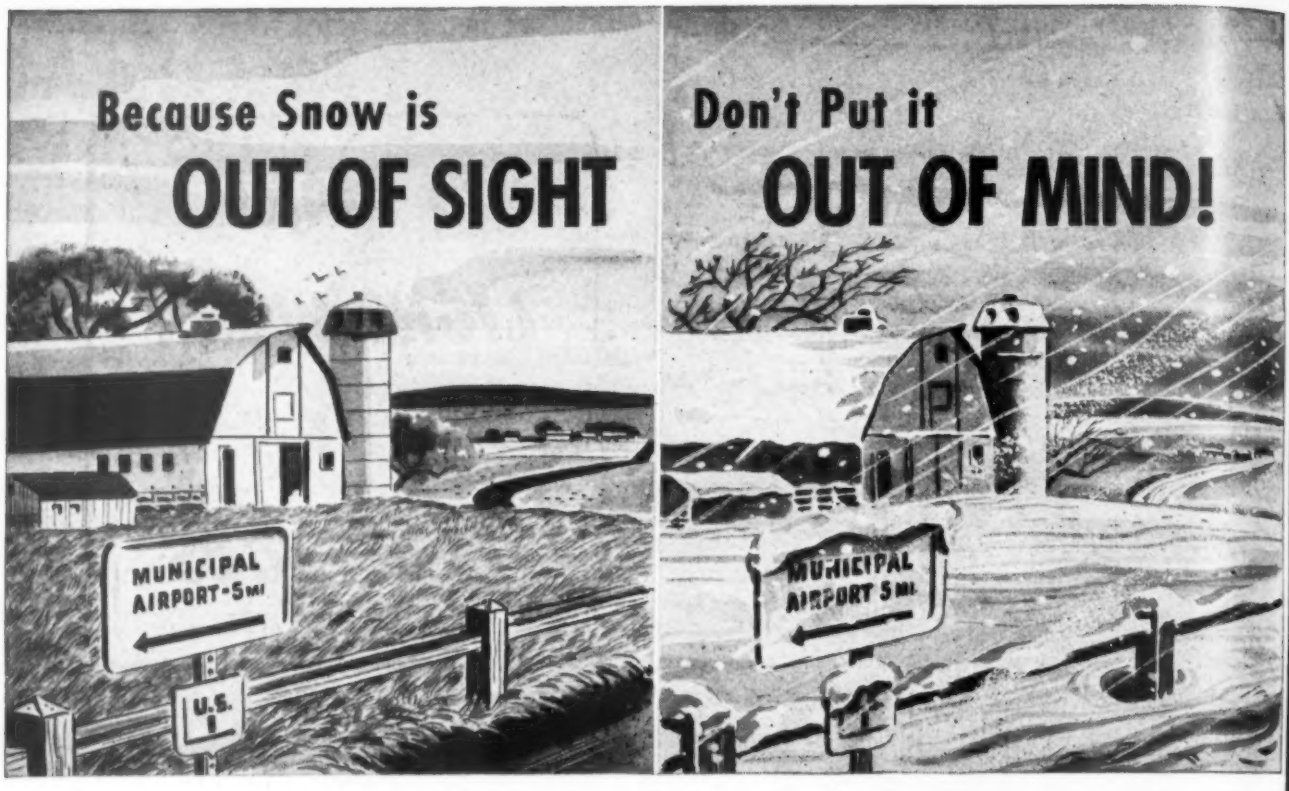


NOW is the time to Select Equipment for Next Winter's Snow Removal

Equipment "on order" will not keep your highways free of snow next winter! Yet, you may find yourself in exactly that position . . . if you wait too long to order the specialized snow removal equipment vital to winter highway maintenance.

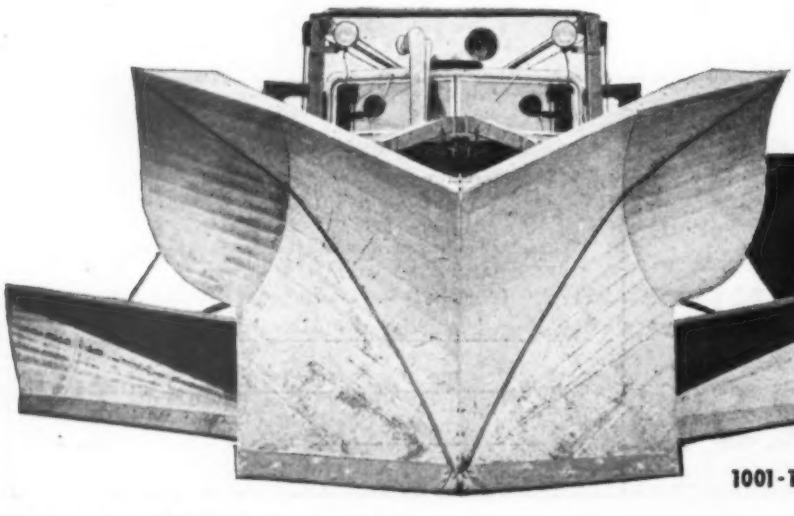
Tackle the problem today! Figure your requirements in the light of last winter's experience and next winter's needs. Then get the facts on Walter Snow Fighters. Compare their engineering features and performance record with any other type of equipment.

Naturally, the restricted quantity of Walter Snow Fighters allotted for civilian use must be released on a "first come, first served" basis. Act NOW to assure delivery in time for the first snow storm next winter.

Important Advantages of WALTER 250 H. P. SNOW FIGHTER

- Clears a 28 ft. width in one run—has rugged power to smash through road-blocking drifts, plus speed to clear more miles per hour.
- Throws snow far to the side—makes widening-out easier.
- Does not waste power in slipping, stalling or wheel-spinning, because the exclusive Walter 4-Point Positive Drive delivers power to each of FOUR driving wheels according to its traction at any instant.
- By clearing main highways faster, you gain extra time for opening more miles of secondary roads.

WRITE TODAY for detailed literature.



WALTER
SNOW FIGHTERS

WALTER MOTOR TRUCK CO.
1001-19 IRVING AVE., RIDGEWOOD 27, QUEENS, L. I., N. Y.

I'M THE GUY WHO HAD TO BE SOLD ON HARD-FACING TRACTOR ROLLERS!

I FIGURED THIS WAY...

"Stoody Self-Hardening was so much harder than steel it would probably chip."

WRONG! Under all but the most adverse conditions, Stoody Self-Hardening will wear smoothly, without chipping or spalling. If operating conditions are ever sufficiently severe to cause failure of Stoody Self-Hardening, high carbon steel deposits would likewise fail.

SO I ARGUED...

"O.K., maybe it won't chip but if Stoody Self-Hardening is so hard, it'll probably increase rail wear."

DON'T believe it—Stoody Self-Hardening has a much lower coefficient of friction than any ordinary steel, including high carbon! If hard-facing is applied evenly to rollers and concentricity is maintained, actually *less* rail wear occurs because of reduced friction.

THEN I MUMBLED...

"Well—even though roller chipping and rail wear are out, Stoody Self-Hardening's harder than heck to grind!"

CERTAINLY it's hard to grind—grinding is *abrasion*, and this test simply proves our point: that Stoody Self-Hardening is far more abrasion resistant than ordinary steel or the best high carbon that money can buy. But don't let this stop you—Stoody Self-Hardening can be applied much more evenly and smoothly than high carbon electrodes. If care is taken to eliminate hills and valleys in the deposit—and fair roller concentricity is maintained—grinding can be entirely eliminated! Or, if grinding of rollers is considered necessary, the smoother and more even deposits of Stoody Self-Hardening permit finishing of rollers as quickly as the rougher high carbon deposits.

SO I SHOT MY LAST ARGUMENT...

"How about cost?"

STOODY Self-Hardening costs 50¢ per lb. f.o.b. Whittier, California, or distributor's warehouse. But—Stoody Self-Hardening outwears the best high carbon steel electrodes by 2 to 1 or more! 1) Stoody Self-Hardening *doubles* the roller life, 2) the tractor owner eliminates one rebuilding job and 3) he saves the expense of tearing down the frame and pulling the rollers an extra time—Aren't these savings worth far more than the few cents' difference in cost between high carbon and long wearing Stoody Self-Hardening?

Stoody Self-Hardening is available in coated and bare rods for D. C. electric application from 600 United States distributors. 75 lbs. is ample to hardface 12 rollers on a large tractor. Place a trial order today and prove to yourself Stoody Self-Hardening's advantages.

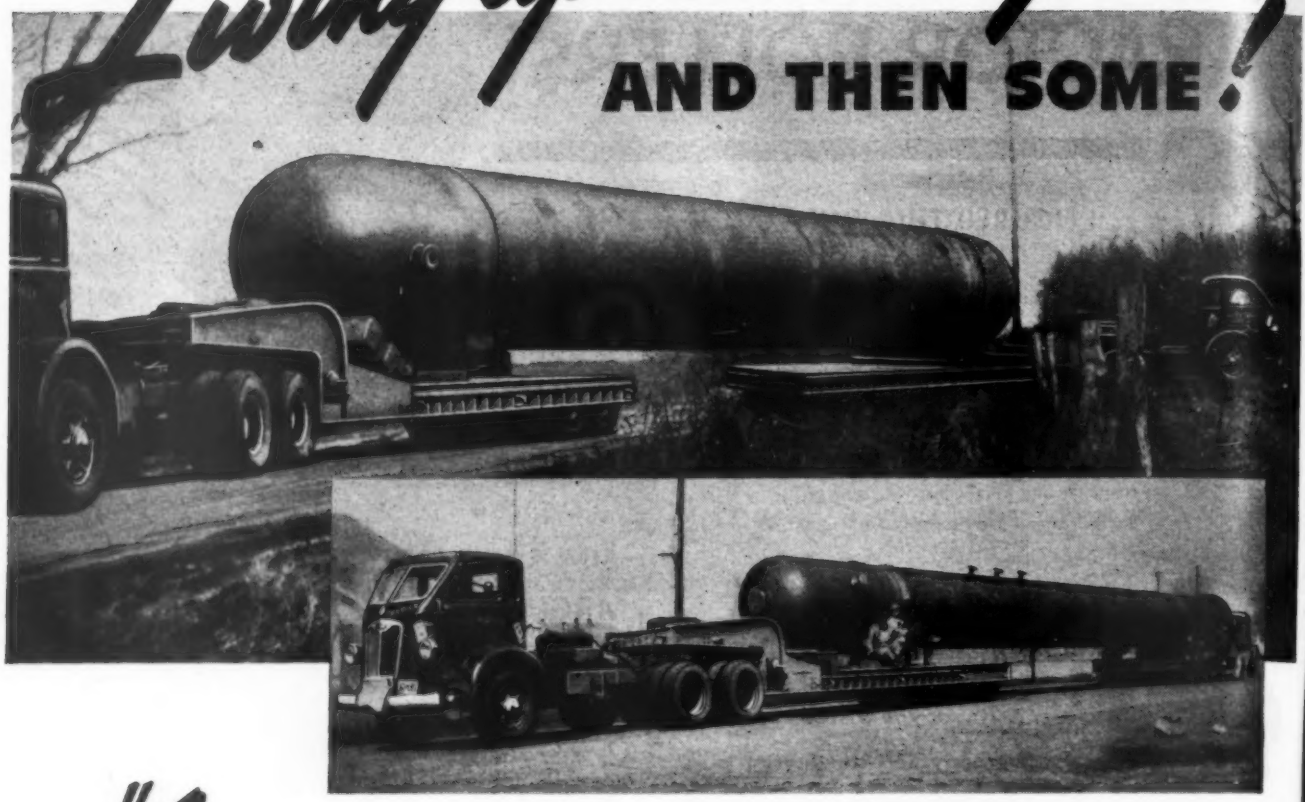
STOODY COMPANY

1125 WEST SLAUSON AVENUE, WHITTIER, CALIFORNIA

STOODY HARD-FACING ALLOYS

Retard wear... Save Repair

Living up to a slogan— AND THEN SOME!



"ANY LOAD THAT FITS THE ROAD!"

IS THE SLOGAN OF THE ARTHUR MORGAN TRUCKING COMPANY, ST. LOUIS, WHO SPECIALIZE IN MOVING HEAVY EQUIPMENT, AND DEPEND ON FRUEHAUF CARRYALLS FOR THIS WORK

But the Morgan people went beyond their slogan when they tackled the job of moving this huge gasoline cracking tank to the Illinois oil fields. For the big tank—weighing 100 tons—had to be hauled not only over the highway, but also through two miles of open fields to reach the job site.

The tank was loaded on two Fruehauf heavy-duty Carryalls, each coupled to a tractor. The combination unit had 52 wheels. Vehicles and load measured 128 feet long, 10 feet wide and 15 feet high.

Special permits were secured and the State Highway Patrol blocked out 10 miles of the Illinois State Highway while the load went through.

This is an unusual operation, of course, but it shows the adaptability of Fruehauf Carryalls to difficult, specialized hauling jobs that couldn't be handled by any other means.

Fruehauf Carryalls are built in a wide selection of sizes and designs. They range in capacity from 10 to 100 tons . . . are available in either semi or full-Trailer types . . . single or double-drop frame . . . side or rear loading . . . with 4 tires or up to 24 . . . in a variety of wheel and axle combinations . . . any width . . . any length . . . the applications to your special needs are endless.

There is no inclination to adjust your requirements to our product—because it is just as easy, and far more satisfactory, to fit our product exactly to your requirements.

Today is none too soon to have our engineers prepare the blueprints for your postwar Carryall. This costs you nothing extra—but it may save you weeks in the long run.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY • DETROIT

Service in Principal Cities

Fruehauf Trailers

A TRUCK IS LIKE A HORSE — IT CAN PULL MORE THAN IT CAN CARRY

"Engineered Transportation"

Three HELTZEL Bulletins For Post-War Concrete Construction Equipment

These bulletins contain all the latest information on concrete construction equipment, **including new war-time developments.**

Bulletin A-20 . . . Steel Forms for building concrete curbs, curb and gutters or sidewalks. A visual demonstration of the equipment required for all types of street improvements.

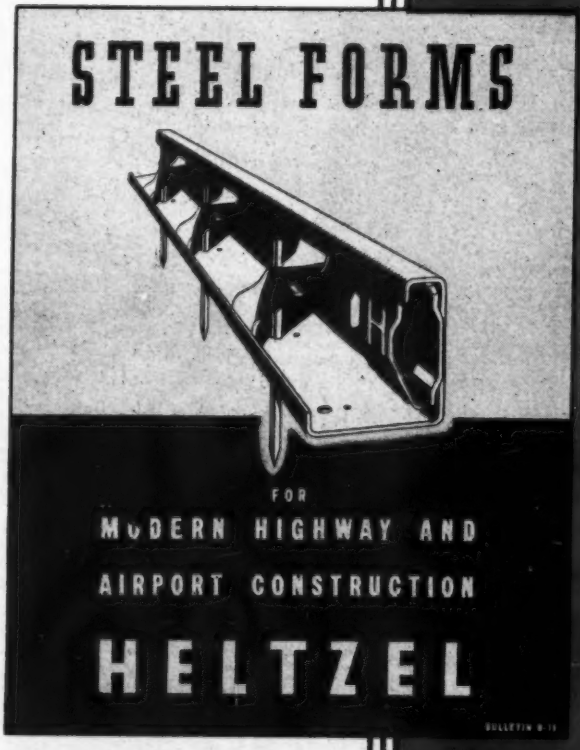
Bulletin B-19 . . . Steel Forms for Concrete Highway and Airport Construction. Shows the attachments available for constructing all types of curbs, etc., at the time the pavement is laid.

Bulletin C-34 . . . Portable Bins. Complete detail and data on batching plants from 52 to 100 tons capacity for either batch-truck or truck-mixer operations.

Catalogs and data are available for any size Central Mixing Plant . . . Truck Mixer Charging Plants . . . Portable or Stationary Bulk Cement Batching Plants or Tanks . . . Steel Storage Bins . . . Sub-grade Planers and Testers . . . Concrete Buckets . . . Joint Installing Machines and Materials.

Information that is vital to every post-war planner. Send for your copies today . . . there's no obligation.

Bulletin A-20
Street Improvements



Bulletin C-34
Batching Plants

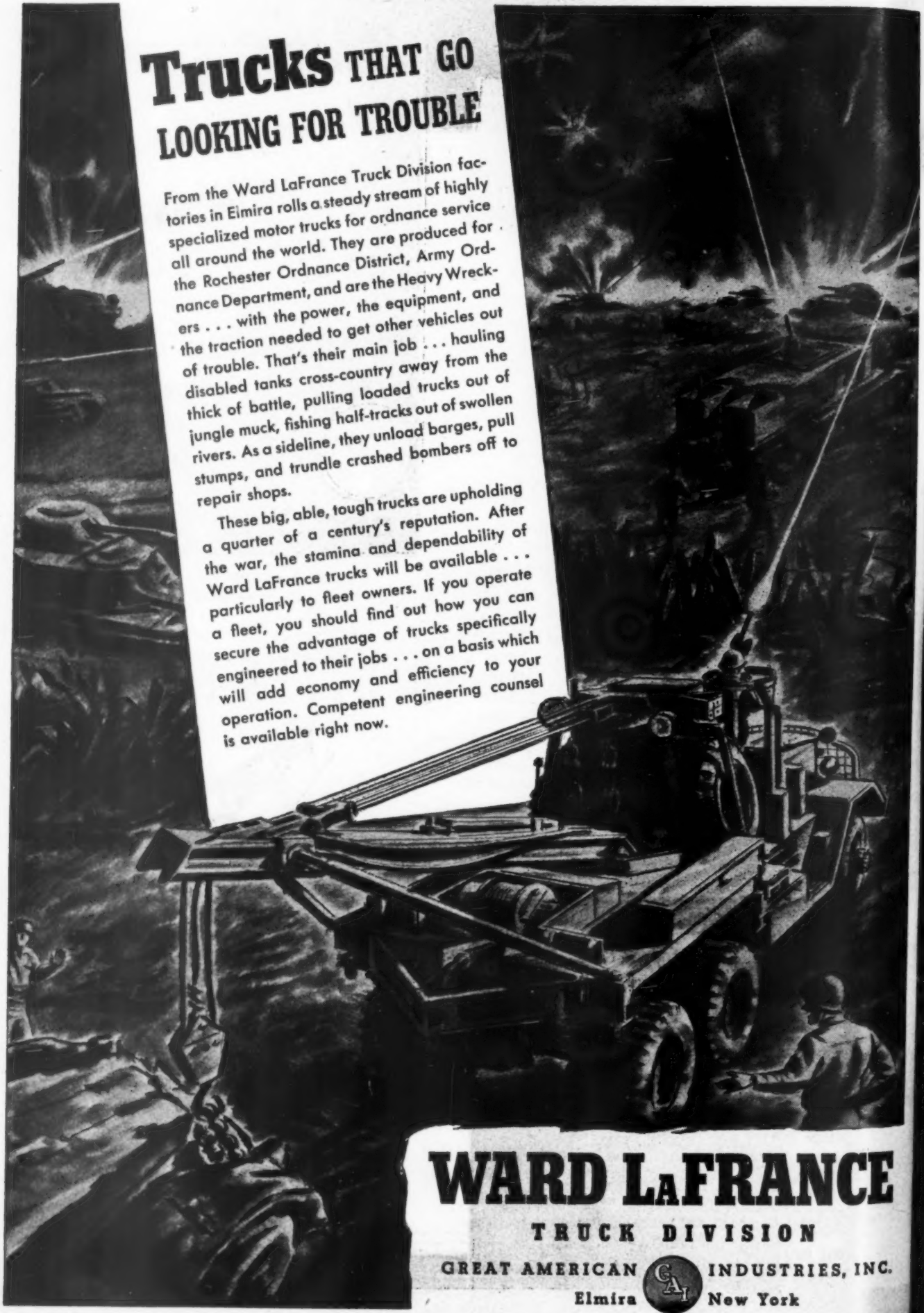
Bulletin B-19
Highway & Airport Forms

HELTZEL Steel Form & Iron Co., Warren, Ohio

Trucks THAT GO LOOKING FOR TROUBLE

From the Ward LaFrance Truck Division factories in Elmira rolls a steady stream of highly specialized motor trucks for ordnance service all around the world. They are produced for the Rochester Ordnance District, Army Ordnance Department, and are the Heavy Wreckers . . . with the power, the equipment, and the traction needed to get other vehicles out of trouble. That's their main job . . . hauling disabled tanks cross-country away from the thick of battle, pulling loaded trucks out of jungle muck, fishing half-tracks out of swollen rivers. As a sideline, they unload barges, pull stumps, and trundle crashed bombers off to repair shops.

These big, able, tough trucks are upholding a quarter of a century's reputation. After the war, the stamina and dependability of Ward LaFrance trucks will be available . . . particularly to fleet owners. If you operate a fleet, you should find out how you can secure the advantage of trucks specifically engineered to their jobs . . . on a basis which will add economy and efficiency to your operation. Competent engineering counsel is available right now.



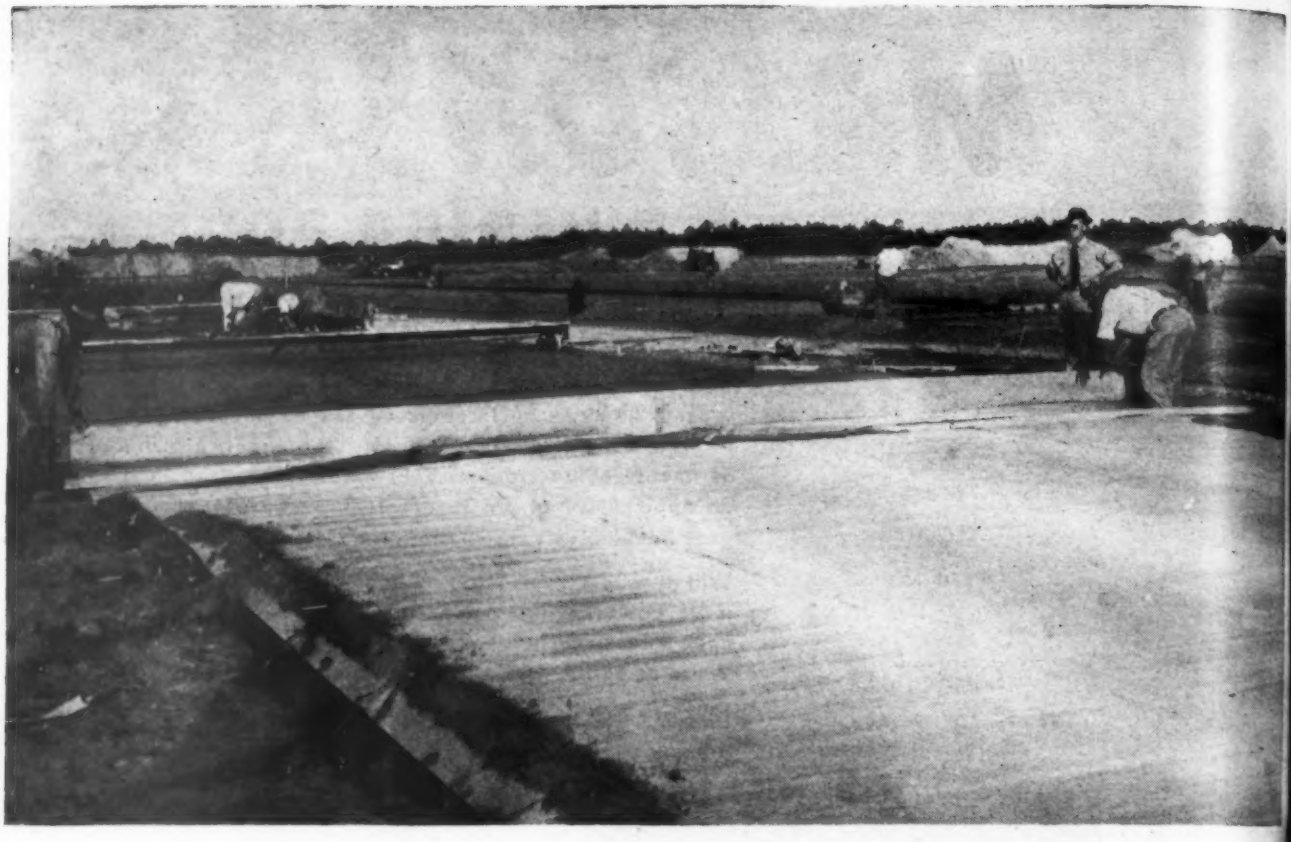
WARD LaFRANCE

TRUCK DIVISION

GREAT AMERICAN INDUSTRIES, INC.

Elmira New York

MARIONS TO START
A BUILDING BOOM . . .
Staggering figures reveal a building boom of unprecedented proportions is in the offing. MARION shovels, draglines, cranes and pull-shovels will have a lot to do with starting this boom. Their amazing record of achievements during this war — their around-the-clock performance—their tremendous capacity for profitable yardage — have earned the confidence and respect of important contractors everywhere. They see in MARIONS an opportunity to bid successfully and profitably on the biggest backlog of construction in the Nation's history.
Will new MARIONS be available for this work? Yes, — faster, more powerful, more economical MARIONS to enable you to cope effectively with all postwar material handling problems. Write us about your plans.
THE MARION STEAM SHOVEL COMPANY, Marion, Ohio
Offers
CRANES ★ PULL-SHOVELS
CLAMSHELLS ★ SHOVELS
DRAGLINES ★ WALKERS
For Every Material Handling Job
3/4 cu. yd. to 35 cu. yds.
BUY WAR BONDS
MARION



SISALKRAFT As It Was . . . and As It Will Be, When Victory is Won!

Five hundred SISALKRAFT Blankets were used on this prewar concrete job — each blanket 28½ x 60 ft.!

Tough, weather-resistant and scuff proof, SISALKRAFT blankets have been used and re-used — then put to further use in protecting sub-grade and materials. Their usefulness doesn't "wear out".

Those very same qualities that made SISALKRAFT the preferred concrete curing agent are the reasons why it is now protecting war supplies enroute to fighting fronts.

Directly exposed to rain, salt water, sleet, freezing temperature and tropical humidity, SISALKRAFT is setting new records for toughness, weather resistance and endurance under the most severe conditions.

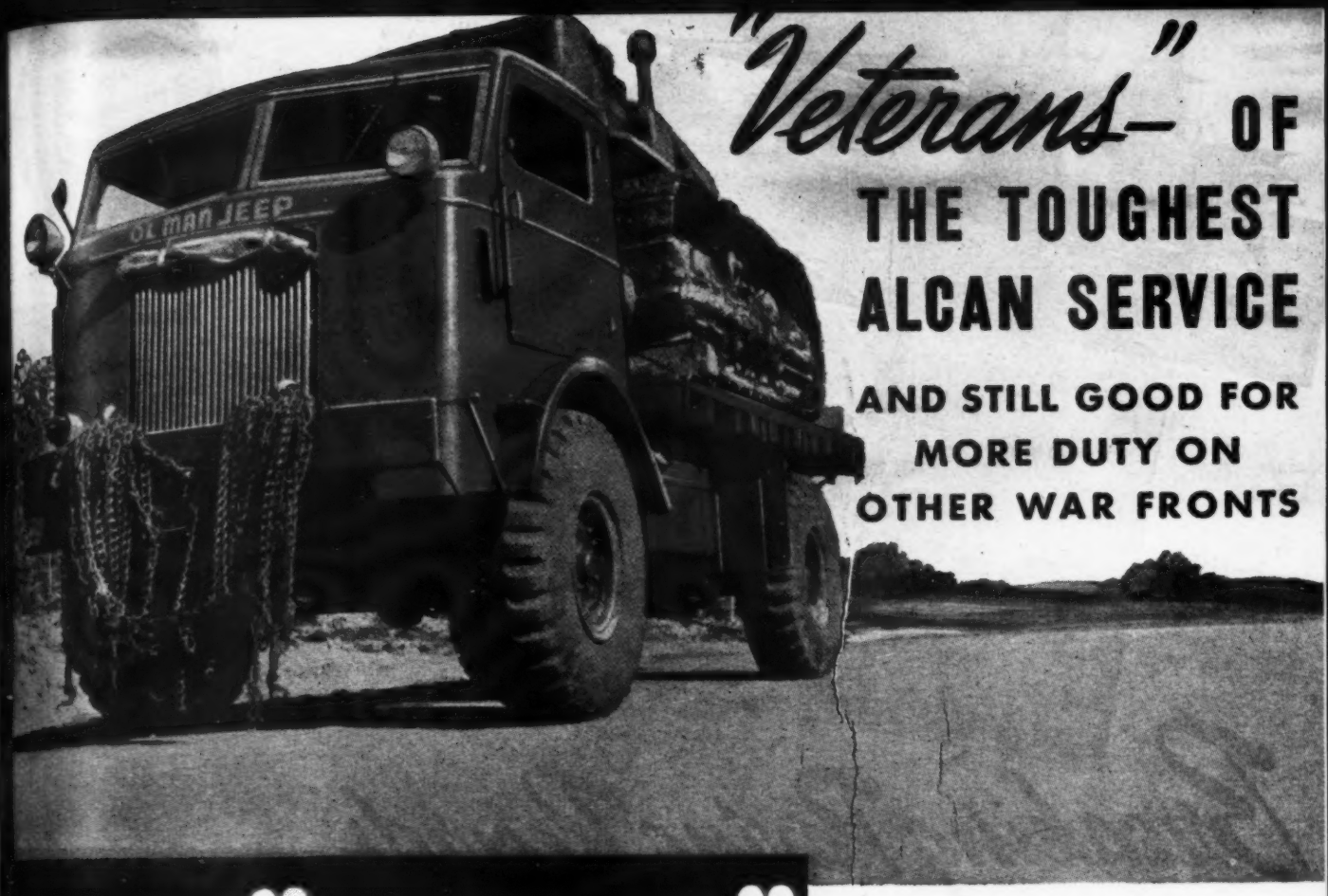
For over 24 years SISALKRAFT served the construction industry as dependable protection for newly poured concrete and materials and equipment stored in the open.

Specified by the Highway Departments of 40 states, SISALKRAFT set new standards in curing concrete roads and runways. On millions of yards of paving, from coast to coast, it proved its unmatched ability to prevent quick evaporation from newly poured concrete. Its low cost was an added factor of importance.

When Victory is won, SISALKRAFT will again be available for peacetime uses — with a war record of amazing performance that proves beyond question its unmatched toughness and weatherproof qualities. Write it into your plans!

THE SISALKRAFT CO.
205 W. WACKER DRIVE · CHICAGO 6, ILL.
NEW YORK · SAN FRANCISCO · LONDON · SYDNEY

Manufacturers of SISALKRAFT, FIBREEN, SISAL-X, SISALTAPE AND COPPER-ARMORED SISALKRAFT



"Veterans" OF THE TOUGHEST ALCAN SERVICE

AND STILL GOOD FOR MORE DUTY ON OTHER WAR FRONTS

FWDs "ON TIME"

ON ALL MISSIONS • ON ALL FRONTS • WAR, INDUSTRY AND COMMERCE

No alibis! "Mission accomplished" is the report that's expected . . . and the report that comes through . . . ON TIME . . . on every assignment FWDs tackle. The toughest of war jobs doesn't get them down. The driver of "OLD MAN JEEP," shown above, wrote: "Every day FWDs pull some less fortunate truck out of a ditch or mudhole. This ALCAN project has been the most extreme testing ground for all types of motorized equipment, and believe me, FWDs come through!"

And these rugged FWDs "come back for more." Their ability to "take it" is *helping to keep more FWDs in service also on the home front* . . . where their ON TIME service, economy of operation, conservation of tires and parts, and all 'round dependability are vital factors in maintaining Victory speed-schedules.

THE FOUR WHEEL DRIVE AUTO COMPANY
Clintonville, Wisconsin

Canadian Factory: KITCHENER, ONTARIO

TODAY HEAVY DUTY TRUCKING IS "WAR-CONNECTED" DUTY

In war-connected COMMERCIAL DUTY
"sure-footed" and safer on the road, FWDs can take curves and grades with greater speed and safety . . . maintain schedules ON TIME in any weather . . . haul more at less cost, . . . ON TIME!

In War-connected HIGHWAY and CONSTRUCTION DUTY
On heavy all-season hauling . . . snow removal and all the tough jobs . . . 4 out of every 5 trucks are FWDs . . . keeping work schedules ON TIME!

In war-connected OIL FIELD DUTY
On tough jobs, heavy hauls, with full loads and crews, FWDs have capacity to go through, ON TIME, over terrain impassable to ordinary trucks. That's why FWDs outnumber all others in oil field service.

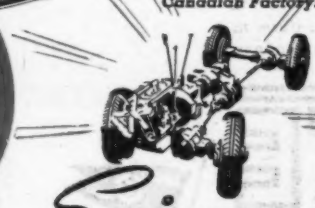
In war-connected UTILITY DUTY
FWDs get through with trouble-shooting crews, equipment and supplies to meet every emergency, in any weather, on or off the highways. FWDs are first choice of more than 150 big fleet-operating utilities.

In MILITARY DUTY
Consistent with their outstanding World War I records, FWDs again are "out front" in military duty. Today practically every wheeled motor vehicle in military service employs the four-wheel-drive principle.

In FIRE-FIGHTING DUTY
The added responsibilities of protection of property and life from fire in wartime are met without compromise by FWDs greater speed with safety, and superior "going power."

The Oldest and Original Exclusive
Builders of Four-Wheel-Drive Trucks

FWD TRUCKS

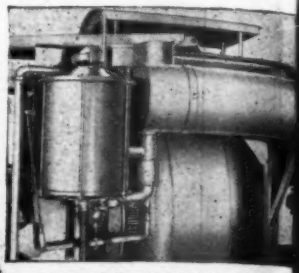


Savings in

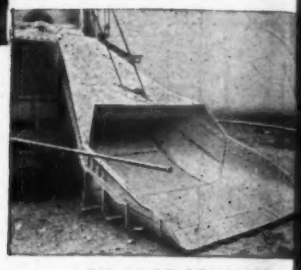
Multi Foote Pavers working in tandem speed up completion of airport runways in America.

Somewhere in England a pair of 34-E Multi Foote Pavers pave 210 feet of 25-ft. runway 8-in. thick every hour.

DOUBLE CONE DRUM

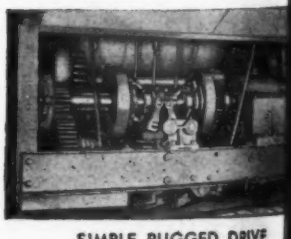


TROUBLE-FREE WATER SYSTEM



BIG WIDE SOLID SKIP

HIGH OPERATING PLATFORM



SIMPLE RUGGED DRIVE

ROTARY DISCHARGE

Breaking Paving Records

Is a Habit of Ours at Home and Abroad

Paving airport runways and roads at record-breaking speed is an every day job for Multi Foote Pavers. They set more records than any other make, not only because there are more of them in service but because all these features mean better mixing and faster charging and discharging:

DOUBLE CONE DRUM with its end-to-end scouring action insures a complete and thorough mix of every batch.

TROUBLE-FREE WATER SYSTEM is simple, accurate and independent of water pressure.

HIGH OPERATING PLATFORM assures greater visibility and faster, more accurate work.

ROTARY DISCHARGE takes only a quarter turn to kick concrete into the big bucket ready to speed out the long boom to be discharged.

BIG, WIDE, SOLID SKIP prevents spilling and assures fast, positive charging.

SIMPLE, RUGGED DRIVE provides fast, smooth action.

Multi Foote Pavers are leading the field all over the world. Machines that can win the battle of putting down runways and roads in war theatres everywhere are a sure thing to make money for you on peacetime road contracts. Write direct or ask your Foote dealer for all the details.

THE FOOTE COMPANY, INCORPORATED, Nunda, New York

The World's Largest Exclusive Manufacturers of Concrete and Black Top Pavers. ★ *Multi Foote Pavers Conform to A. G. C. Standards and Specifications.*

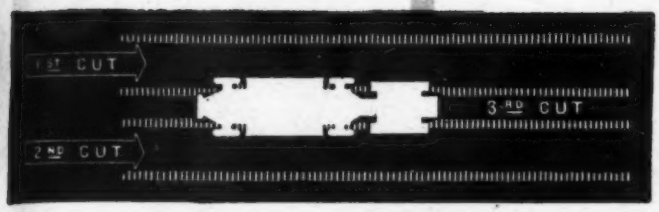
MULTI FOOTE

CONCRETE PAVERS

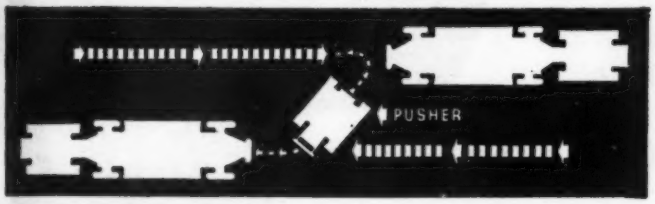
ARMY (E) NAVY

Here's the cheapest, best way to

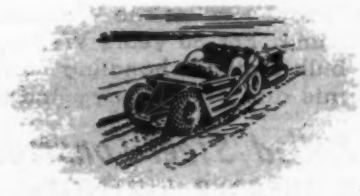
STRIP TOP SOIL



One way to get bigger heaped loads with less power is to leave a ridge about ½ the width of the cutting edge between successive cuts. Then straddle this ridge on the next trip through, thus pushing a thick slice of material into the center of the scraper.



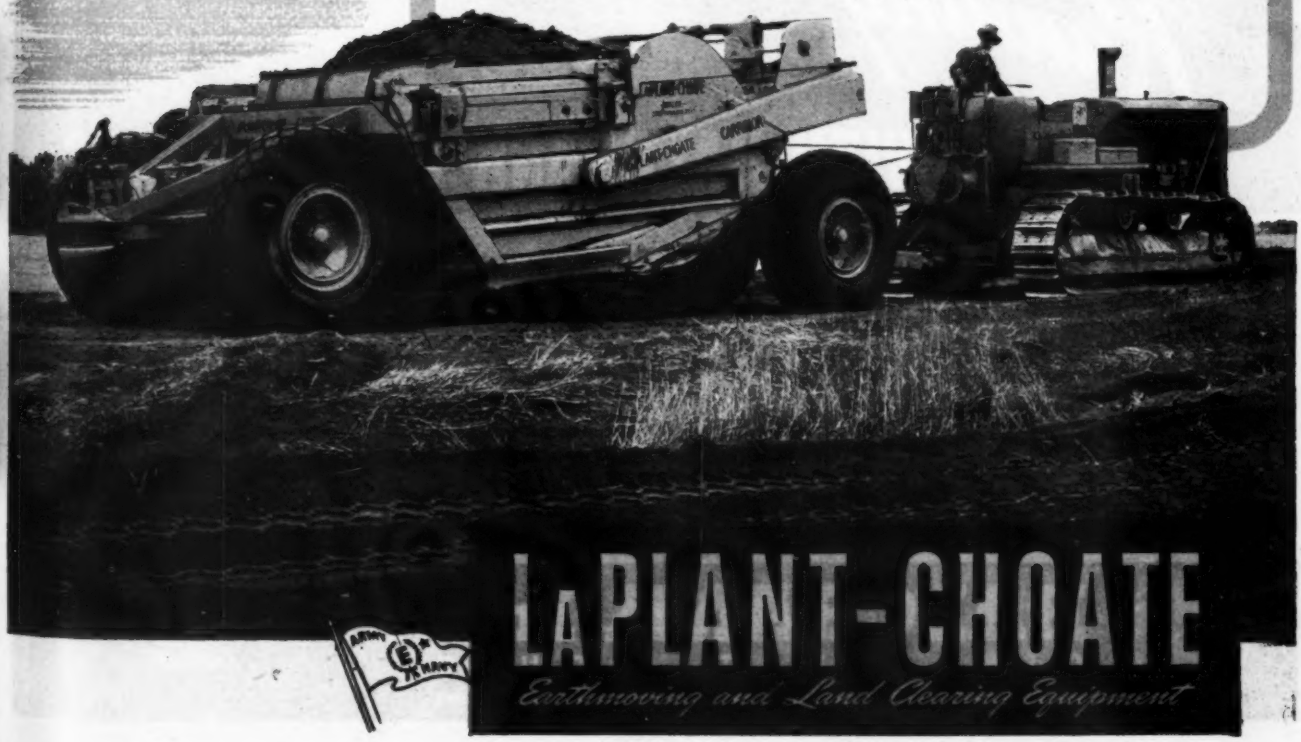
In loading with a pusher tractor in short pits, it sometimes pays to load in opposite directions and schedule your operations so that the instant your pusher finishes loading one scraper, it can swing around and start loading another. This saves pusher turning and waiting time.



Experienced operators agree that nothing else compares with a tractor-drawn scraper when it comes to removing top soil from large, open areas. This is because a scraper can strip off as much (or as little) top soil as necessary . . . haul it away and stock pile it . . . pick it up later and spread it in smooth, even layers for seeding. Saves time and money, gives you a better finished job and enables you to release less adaptable equipment for other work. To help keep your present LaPlant-Choate equipment in "fighting trim," see your LaPlant-Choate "Caterpillar" distributor—for useful operating ideas, for reliable parts and service. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

WHAT'S COMING?

After the war LaPlant-Choate will be ready with a complete new line of cable and hydraulic operated dozers and scrapers—built exclusively for all sizes of "Caterpillar" track-type and rubber-tired tractors. This new LaPlant-Choate equipment—much of it developed especially for the armed forces and thoroughly proved under the most trying conditions—will offer improvements never before dreamed of in the earth-moving industry. So plan now for the future.



LaPLANT-CHOATE

Earthmoving and Land Clearing Equipment

WELLMAN WILLIAMS TYPE BUCKETS

SINCE 1931 Wellman Buckets have combined the many special mechanical features of the famous Williams Clamshell Bucket with the construction "know-how" of The Wellman Engineering Company. For 50 years Wellman has built heavy bulk material handling equipment for steel plants and other heavy industries.

Multiple Rope and Power Arm Types • Dragline • Power Wheel • Dredging • Special Service Buckets ⅜ to 16½ Yd. Capacities.
ARMY
E
NAVY

Welded Rolled Steel Construction

FOR GREATER STRENGTH
LIGHTER WEIGHT • LONGER LIFE

Welded construction, once confined to custom-built Wellman Buckets for steel mill and dredging service, is now featured in every Wellman-Williams Bucket.

SEND FOR FREE BULLETIN

Tell us about your particular requirement and we will send full description of construction and features in special bulletins which clearly prove why YOUR NEXT BUCKET SHOULD BE A WELLMAN.

THE WELLMAN ENGINEERING COMPANY
7003 CENTRAL AVENUE • CLEVELAND 4, OHIO
SALES AND SERVICE AGENCIES IN PRINCIPAL CITIES

Keep OLD EQUIPMENT *Running* WITH BALCRANK GREASE GUNS

STRONG AND SIMPLE

Strong and Simple—built for tough use. Mud begrimed fittings yield easily to their powerful pressure —they get the lubricant where it ought to be . . . force the sludge and dirt out.

Keep your road equipment on the job—keep it friction free—avoid lost time—costly repairs. Several hand guns on the job for spot service plus a handy, portable volume lubricator are the best "equipment" life insurance you can carry. Ask your dealer about Balcrank or write for catalog.

BALCRANK Inc.
CINCINNATI 9, OHIO
EST. 1906
MANUFACTURERS OF A COMPLETE LINE OF LUBRICATION EQUIPMENT

AN OPEN LETTER

TO THE NATION'S ROAD BUILDERS

HUBER is pleased to announce plans have been perfected to build a complete line of modern road machinery the moment the war ends. The line will include: Three-wheel Type Road Rollers from 5 to 12 tons; Tandem Rollers from 3½ to 12 tons; Maintainer, Bulldozer, Speed Scoop, Sweeper, Mower and Snow Plow.

To make sure the plans were right, a thorough research into the postwar future of road building and maintenance was made. To these findings were added HUBER'S seasoned knowledge of Road Builder's needs plus its years of experience in building dependable road machinery. With such a background to draw upon, the new HUBER Line becomes an outstanding contribution to the road building industry and the greatest achievement in HUBER'S history.

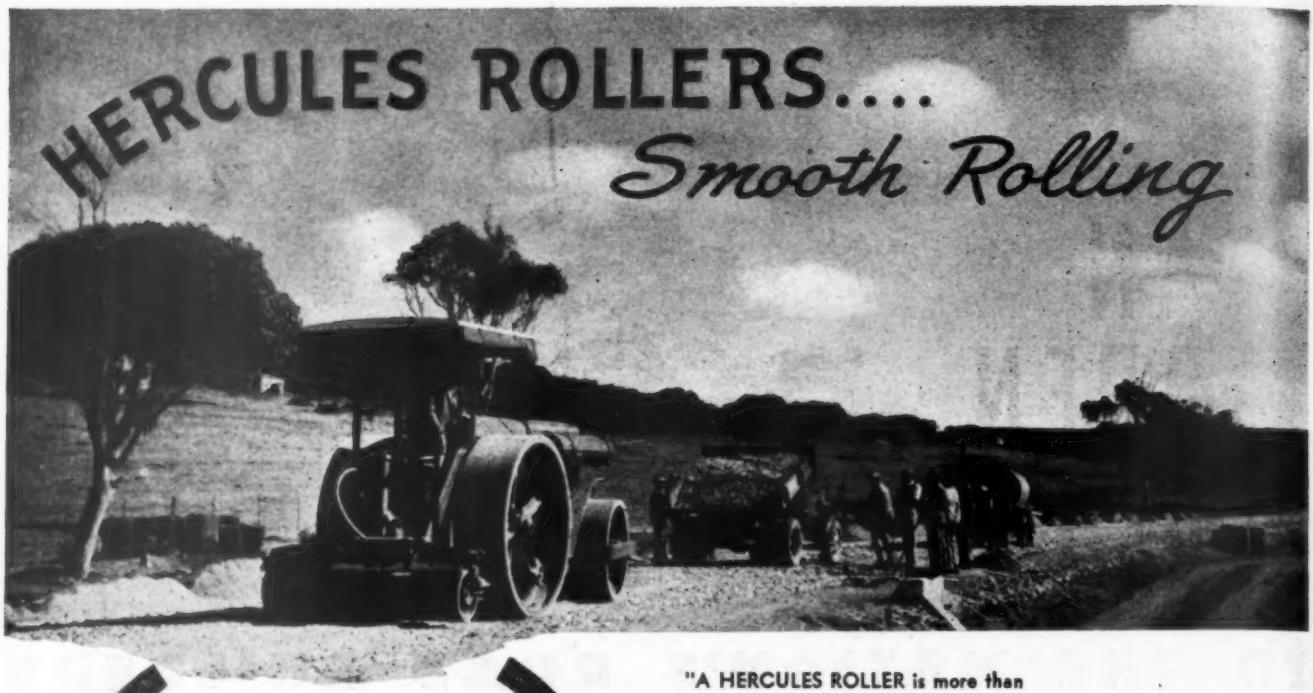
To insure manufacturing excellence in building this new HUBER Line, thousands of dollars have been invested in the latest of machine tools and production methods. HUBER is proud of its new Road Machinery for it measures up in every way to the big demands that will be made on it when the postwar road building activities start. Distributors interested in the new HUBER Line are urged to write us. Some choice territories are still available.

Don Howard

President.

THE HUBER MFG. COMPANY · MARION, OHIO, U.S.A.

3 WHEEL ROLLERS · TANDEM ROLLERS
MAINTAINERS · BULLDOZERS
SPEED-SCOOPS · SWEEPERS
HIGHWAY MOWERS · SNOW PLOWS



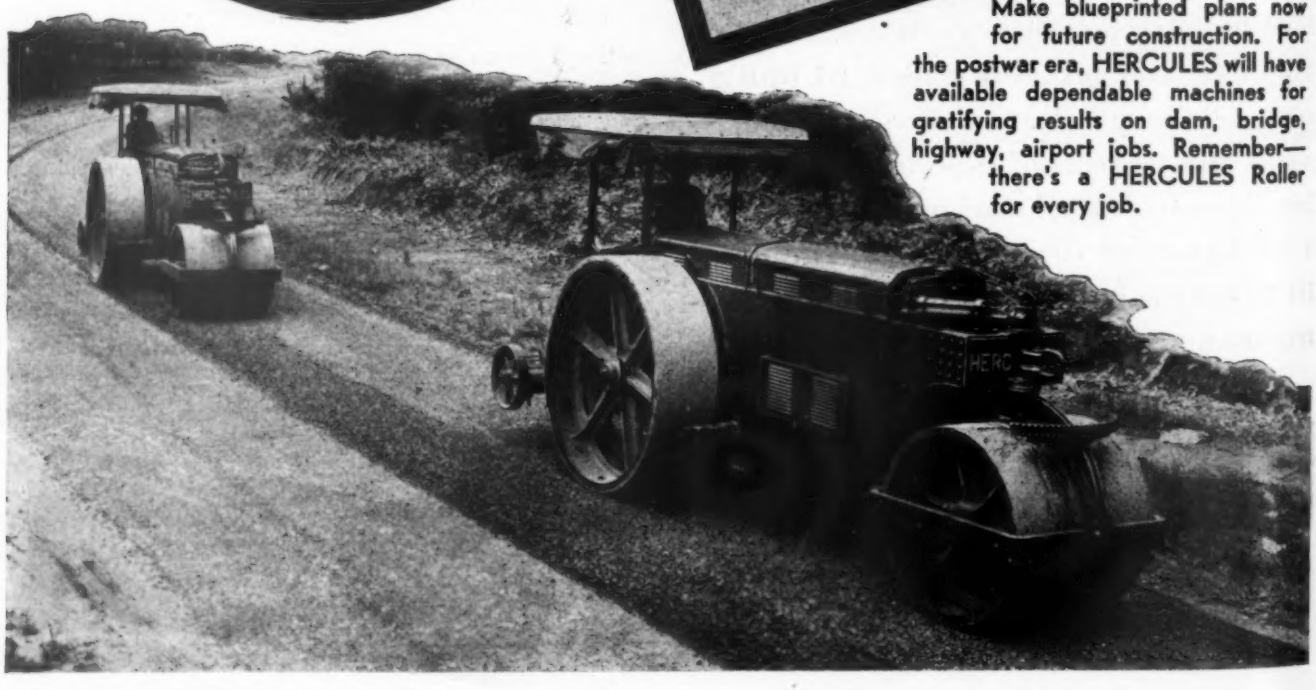
HERCULES ROLLERS HAVE MOVED TO BUCYRUS, OHIO

From new headquarters there, or through authorized distributors, The Hercules Roller Company is prepared to furnish repairs and service information on machines in the field, promptly and efficiently. Bring your Roller problems to us.

THE HERCULES ROLLER CO.
Bucyrus - Ohio

"A HERCULES ROLLER is more than a Roller—it's a complete road machine."

Make blueprinted plans now for future construction. For the postwar era, HERCULES will have available dependable machines for gratifying results on dam, bridge, highway, airport jobs. Remember—there's a HERCULES Roller for every job.



1894-1944

Pioneers for 50 Years

For half a century, The Cleveland Pneumatic Tool Company has devoted itself to serving many major industries.* Skilled technicians and experienced engineers within our organization have pioneered and perfected many products for each of these fields. Thus initiative and resourcefulness have enabled us to keep abreast of this country's remarkable industrial progress . . . We are commemorating our golden anniversary by continuing to put all our talents and energies in the fight to preserve the American way of life. We are proud to have grown with our nation for 50 years, and look forward to serving in the great future that lies ahead.

Buy U. S. War Bonds and Stamps

**CLECO Pneumatic Tools speed production in metal-working plants. AEROLS (the shock absorbing landing gear used so universally on aircraft) insure safe, smooth landings and take-offs. CLEVELAND Rock Drills are widely used in the mining and contracting fields. CLE-AIR Shock Absorbers protect buses, trucks and trailers from road shocks.*

THE CLEVELAND PNEUMATIC TOOL COMPANY

AND SUBSIDIARIES

THE CLEVELAND ROCK DRILL DIVISION — CLEVELAND PNEUMATIC AEROL, INC.

CLEVELAND PNEUMATIC TOOL COMPANY OF CANADA, LTD.

We started unloading on Oct. 13th

REPORTED by The Lewis Construction Co. after paving the Marine Base runways at El Toro, Calif.

... at the Irvine siding and were in production Oct. 21st. We laid a total of 75,902 tons from Oct. 21st to Dec. 8th, inclusive, averaging 10 hours per day. It was not unusual to mix and lay in excess of 200 tons per hour.....

...with a Madsen Asphalt Plant

THE REPORT CONCLUDES, "We are attaching a detail of the daily tonnages and the hours worked".

This work sheet shows that 75,902 tons were produced in 44 days (466 hours). The average daily output for this 3000-lb. Madsen plant was 1650 tons; the average hourly output was 162.8 tons. The best day's production was 2412 tons in 12 hours.

● How can a Madsen plant produce bituminous paving materials at a speed of more than twice its rated capacity? The answer is greater efficiency and improved methods. In a Madsen plant, the bituminous binder is sprayed in 7 seconds (timed by stop-watch) into the mixer from a direct center-line above the tumbling aggregates. The aggregates are spray coated as they are tossed by the mixer paddles. The binder must filter through the aggregate—not down the side of the mixer.

The deep Madsen Pug Mill Mixer exerts a heavy pressure on the aggregate which densifies the mix and forces the binder to penetrate and become uniformly incorporated with the aggregate. The large mixer gate dumps a batch (timed by stop watch) in 4 to 6 seconds. All plant operations are synchronized to the faster mixing speed of this twin-shaft pug mill mixer.

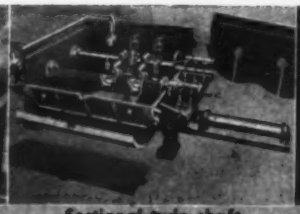
Learn more about the many time-saving, profit-making Madsen-patented features; write for catalog.

MADSEN IRON WORKS
HUNTINGTON PARK, CALIFORNIA

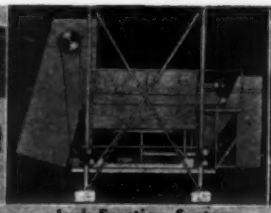
4 EXCLUSIVE MADSEN FEATURES

WRITE FOR CATALOG!

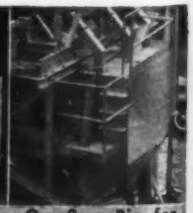
Asphalt Pressure Injection System



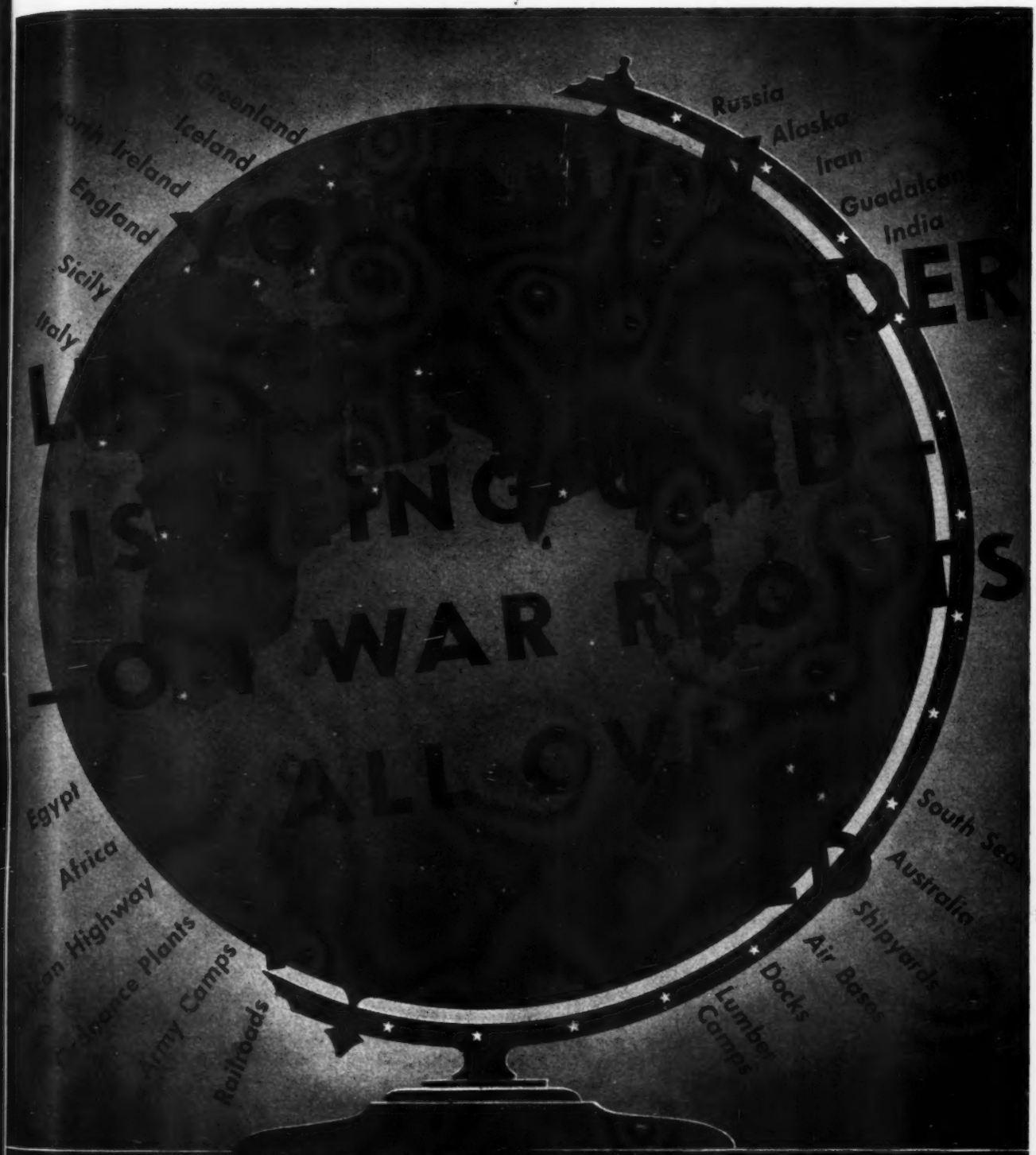
Sectional twin-shaft Pug Mill Mixer



Jack-Erection System and Power Lift



Overflow Bin for easy truck loading



They are lifting, digging, pulling, stacking—performing the many heavy-duty jobs that must be done to get war material to the front. Whether it is building a logging road in Oregon, a thoroughfare to Alaska or docks, camps, roads and bridges, in Iran, these Link-Belt Speeders are giving yeoman service—showing up at its best the precision engineering—the massive, though light-weight, rugged construction of these easy-to-handle machines.

9575

LINK-BELT SPEEDER

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
A DIVISION OF LINK-BELT COMPANY

...how to spread highway materials

The Buckeye Spreader is the ideal machine for spreading sand, gravel, or crushed stone—from a fine trickle of sand to a 1½" layer of rock. It spreads the material with almost absolute uniformity, wasting no material through scattering and leaving no thin spots to cause trouble later. The spread can be tapered, thick on one edge and thin on the other. Width of strips is easily controlled to fit your needs.

With a Buckeye Spreader, there's no need for raking and brooming, no patching, no cleaning up edges, no filling in low spots. Many users report savings up to 50% in time and labor, and 20% on materials—and in addition—they get a better job.

Buckeye Spreaders are easy to use. Every part is designed for maximum strength and treated to resist wear so there is little lost time for repairs.

Write today for illustrated bulletin giving complete data and specifications.

BUCKEYE TRACTION DITCHER CO.
Findlay, Ohio

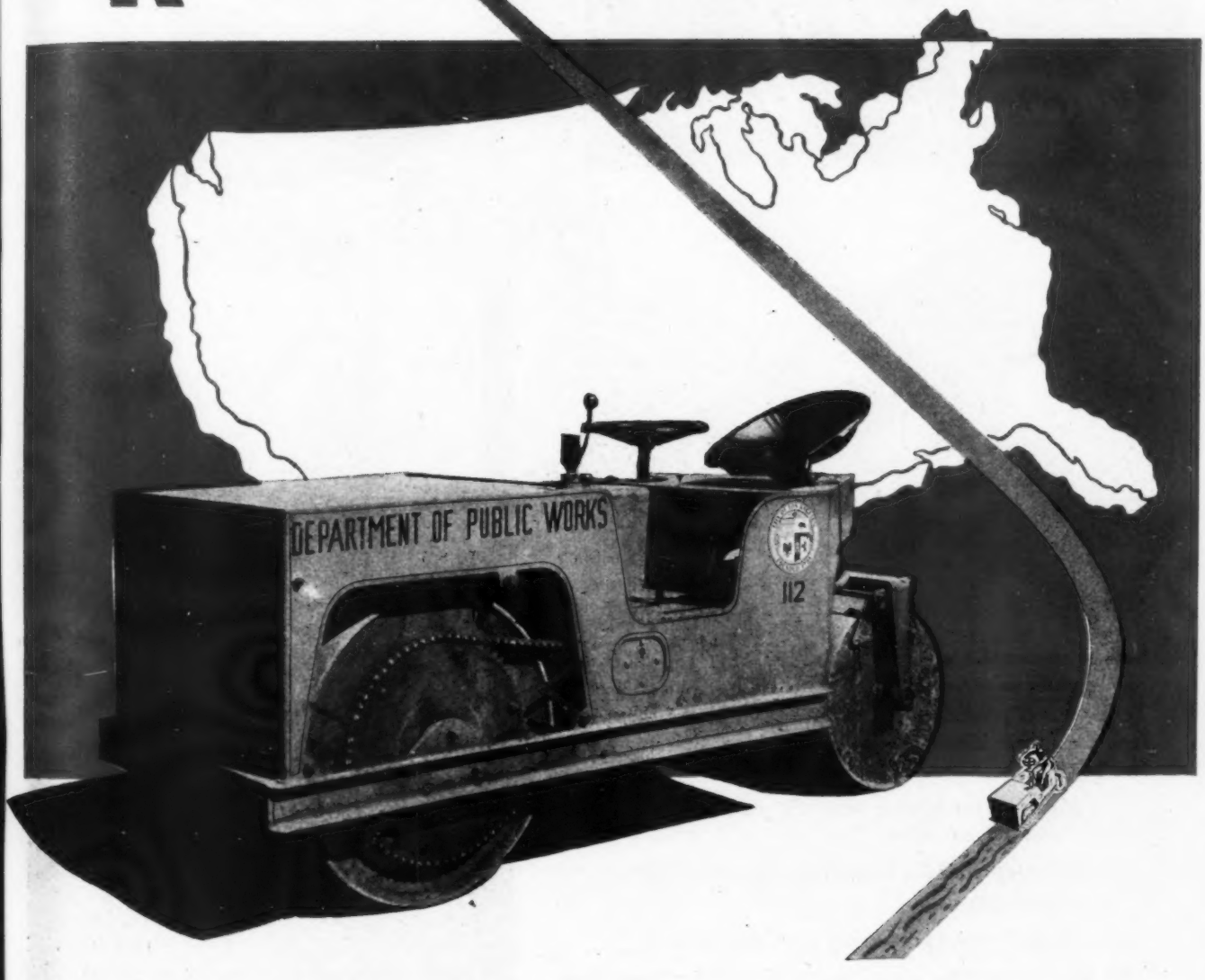
keep your eye on Buckeye

CONVERTIBLE SHOVELS
SPREADERS
POWER FINEGRADERS

Buckeye

TRENCHERS
TRACTOR EQUIPMENT
ROAD WIDENERS

Ready for the Nation's Highways



THE NEW STANDARD-LEWIS ROLLER HAS BALANCE, MANEUVERABILITY, AND FEWER WORKING PARTS

The new Standard-Lewis roller is a good example of the design and engineering behind all Standard equipment. This 2-ton roller embodies a number of exclusive features. It is ready for production when the word is given. Behind it will be a distributor organization second to none. Contractors are assured "tops" in service.

Other Standard road construction equipment: subgraders, paving plants, batching plants, dryers, finishers, brooms.

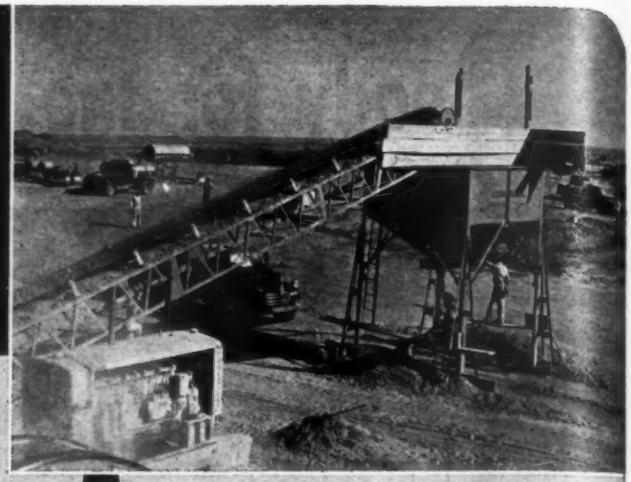
A FEW OF THE FEATURES

The chain drive is adjusted quickly and simply by moving the one piece drive mechanism. This feature eliminates need for idlers and extra moving parts. Steer wheel is split. The yoke carries adjustable sleeve to eliminate play between sections of wheel. All welded, one piece construction.

STANDARD
STEEL CORPORATION

General Offices and Plant: 5001 South Boyle Avenue
Los Angeles 11, California

Over 500,000 Yards of Gravel Per Year!



Success stories of Universal plants are many. Typical is the one recently received from Cage Bros. & J. Floyd Malcolm, Texas, gravel producers. They have given us the following report on their Universal Gravel Crushing, Screening and Loading Plant:

Maximum yardage per hour: 400 yards of material 2" and under.

Average production in continuous operation: 275 yards per hour.

Average annual production: over 500,000 yards.

This compact portable plant consists of a 1036 primary jaw crusher, 40"x 24" secondary roll crusher, 2½ deck 4'x 12' screen, rotovator and conveyors—a lot of gravel produced with a minimum of equipment.

Ask any user of Universal equipment about production costs, fuel consumption, bearing life, maintenance costs and other operating factors. *When results are checked, Universal is the choice!*

UNIVERSAL ENGINEERING CORP.
631 C Avenue, West Cedar Rapids, Iowa

Get Behind the A.R.B.A.!

Officials of the American Road Builders' Association have issued a plea to members, affiliated organizations and other interested parties to launch a well integrated post-war highway building program at once so that the wheels can be set in motion immediately upon conclusion of the war.

A copy of "A Sound Plan," detailing the program to hedge against post-war deflation is available to those interested, from the A.R.B.A., 1319 F St. N. W., Washington, D. C.

ARMY E NAVY

UNIVERSAL

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADERROLLERS, PORTABLE ASPHALT PLANTS

Owners and operators of convertible MICHIGAN Mobile SHOVELS-CRANES are urged to solicit the advice of MICHIGAN engineers and distributors to keep these fast-stepping machines working at peak efficiency for the duration and after . . . Write today for Bulletin RS-64.

UNDER the stress and strain of war-time operation, machines and equipment are wearing out faster than ever before. And, after Victory, it may be some time before new equipment will be available for the "business battles" of peace. When the firing ceases the condition your machines are in may well determine your ability to successfully handle your share of post-war business. No doubt you have a machinery conservation program in effect now, but remember, its ultimate success or failure depends upon how well your operators and mechanics carry it out. Therefore, impress upon them the importance of keeping present machines and equipment in top-notch condition—for their *own* post-war well-being and security.

AIR CONTROLLED

MICHIGAN
POWER SHOVEL CO.
BENTON HARBOR, MICHIGAN

ETNYRE U. S. PATENTED SPRAY-BAR

Attains Unequalled Efficiency in Application of Asphalt Cut-Backs, Tar, Road-Oils, Emulsion . . . In "Black-Topping"

NOTICE

about possible U. S. Patent infringement

At intervals, some "new" spray-bar is presented. Claims are made of how it will improve performance of an owner's distributor if he will buy and put one on his machine.

Etnyre, largest distributor manufacturer, has made more spray-bars than any other producer. Thousands are in use, having applied actually BILLIONS of gallons of asphalt, cut-backs, tar, road-oils and emulsion in YEARS of black-topping service.

Etnyre "Black-Topper" equipment is protected by U. S. Patents with other patents pending.

- **Sprays Any Width . . . up to 24 Feet or Wider**
- **Instant Start or Shut-Off at Every Nozzle**

Controls of entire spray-bar at operator's fingertip.

FULL CIRCULATION IN BAR . . . NO "FROZEN" ENDS . . . NO CONGEALED LIQUID

Replace Obsolete Spray-Bar On Your Distributor Now

Now is the time you should "modernize" your distributor—bring it up-to-date with an Etnyre Pat'd shut-off-at-nozzles spray-bar . . . and thus be ready to meet the rigid black topping specifications of Highway Engineers.

It is significant that U. S. Army Engineers, checking ALL makes of distributors and ALL makes of spray-bars chose the Etnyre. In doing this they substantiated the judgment of thousands of road-contractors and Highway Engineers.

Etnyre pat'd spray-bar on YOUR distributor will pay for itself in a short time by better performance; faster and greater output.

Get in touch with your Etnyre dealer . . . or with us. Give full facts . . . model, year and size of your distributor.

The reason why the Etnyre "Black-Topper" is the most widely-used of all bituminous distributors is that it is the distributor which correctly coordinates FOUR FUNCTIONS SIMULTANEOUSLY—

1. **Heats liquid to proper temperature; maintains it.**
2. **Pumps liquid from tank through circulating system to spray-bar.**
3. **Circulates liquid to and through the spray-bar.**
4. **Sprays liquid with precise accuracy and uniformity which may be varied from 1/10th gal. to 3 gals. per square yard . . . in widths to 24 feet, on flat surfaces, grades, and crowns.**

This liquid may be asphalt, cut-back, tar, road-oil or emulsion . . . from the heaviest to the lightest. It must penetrate, under proper pressure, into heavy aggregates . . . or a lighter application on gravel . . . or a finishing "seal coat." Each square yard applied with utmost uniformity . . . and each yard completely accurate as to amount.

Etnyre Pat'd spray-bars . . . as used by U. S. Engineers on hundreds of Etnyre "Black-Toppers" now in war service . . . make possible this performance, unequaled by any other distributor, or by any other spray-bar.

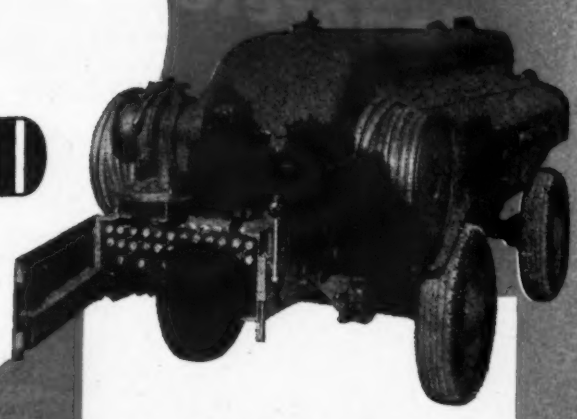
On the Etnyre pat'd "shut-off-at-nozzles" spray-bar each nozzle may be stopped or started instantly . . . as many nozzles as desired may be used . . . any place along bar . . . to spray any width . . . any part of the surface. No bar need be removed. Ends fold up for transit. Get facts now from your Etnyre dealer or write directly to us. Get faster, better "black-topping" with an Etnyre.

ETNYRE *"Black-Toppers"*

The most-widely-used bituminous-materials distributors in the world

E. D. ETNYRE & CO. Founded 1898 **OREGON, ILL., U. S. A.** 173 Bent Street CAMBRIDGE, MASS.

...Where Utilities use COMPRESSED AIR



There are so many jobs where compressed air is needed by power companies—and into this versatile picture fits Schramm Air Compressors. Schramm units—both portable and stationary—are extensively used by the utility field in general field service—generating stations—steam plants—repair shops.

They're compact, lightweight, and easy to start merely by pushing a button.

And they have these distinctive "under-the-hood" features: (1) completely water cooled to provide ideal performance both winter and summer (2) seven main bearing supports (3) mechanical intake valve (4) more cylinders and lighter parts (5) forced feed lubrication.

If you are not already using a Schramm, it will pay you to write today for illustrated bulletin 42-PA.

SCHRAMM INC. THE COMPRESSOR PEOPLE WEST CHESTER PENNSYLVANIA

Check this list to see how many ways you can use SCHRAMM COMPRESSORS

FIELD SERVICE

Digging post holes
Coating asphalt
Operating pneumatic drills and hammers
Paint Spraying
Tamping
Breaking pavements
Laying conduits and cables
Sandblasting for removing paint, cleaning, etc.
Wood boring
Picking ice from streets

STEAM PLANTS

Running, chipping, riveting and caulking hammer
Operating drills, reamers and flue cleaners
Supplying hoists, lifts and jacks
Removing scale, rust and paint by sandblasting

REPAIR SHOPS

Cleaning engines and machines by jets
Operating jacks, lifts and hoists
Running pneumatic hammers, drills, etc.
Operating brazing forges and smith fires
Supplying oil burners
Tire inflation

GENERATING STATIONS

Operation of air circuit breakers

TWIN-RIBBON
Concrete Spreading

• Koehring Paver stability permits practically right angle pouring. Bucket can travel to end of boom for maximum spreading area.

DEPEND ON YOUR KOEHRING DISTRIBUTOR to help you keep your equipment operating. Care for your Koehring equipment *NOW*, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

CUT BATCH CYCLE TIME...

Koehring Pavers, Twinbatch and Unibatch, have the special fast spreading Twin-Door boom bucket. Twin doors, both opening same direction, provide Double-Quick Dumping and Spreading. Twin ribbons of concrete are spread on the grade. Action is instantaneous . . . large Twin-door opening is approximately 13 square feet. Full width of bottom is used for door opening. No choking at bucket doors with dry or harsh concrete. Bucket shaking is not necessary. Seconds saved when dumping and spreading cut batch cycle time.

KOEHRING HEAVY DUTY

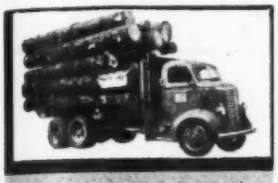
ARMY E NAVY

MEMBER MIXER BUREAU
AFFILIATED WITH A. G. C.

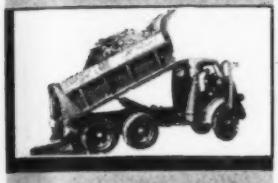
KOEHRING COMPANY
Milwaukee 10, Wisconsin

HEAVY-DUTY CONSTRUCTION EQUIPMENT

HOW TO MAKE YOUR MEDIUM TRUCK EARN MORE MONEY

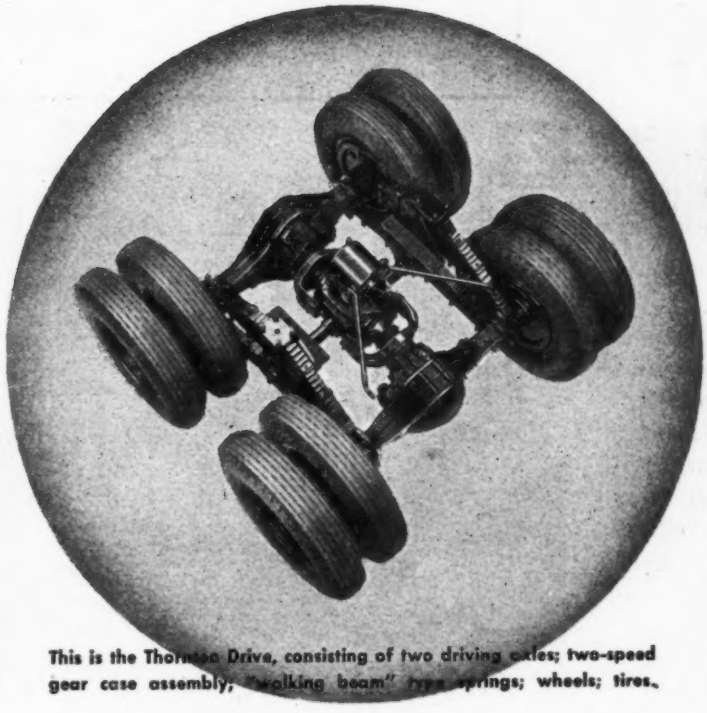


LOGGING



MINING

GENERAL HAULING



This is the Thornton Drive, consisting of two driving axles; two-speed gear case assembly; "walking beam" type springs; wheels; tires.

LUMBERING

OIL PRODUCTION

DUMP TRUCK WORK

ADD THE THORNTON *FOUR REAR WHEEL* DRIVE! CONVERT IT INTO A HEAVY DUTY TRUCK

Whether you own, or expect to buy, a medium truck, you both save and make more money when Thornton properly engineers and installs this 2-drive axle BOGIE, thus converting a 1½-2 ton medium truck into a powerful, 6-wheel heavy duty truck, capable of delivering 100% *more* rim-pull which permits hauling 100% *more* payload through sand, mud, muck, snow, over ice and up steeper grades.

- Make your converted truck do double duty . . . haul twice as much . . . earn more money.
- Write today for full particulars.

You SAVE *on*

√Investment, operation, upkeep.

√Gas, oil, tires, chains, wages, manpower, insurance, time-delivery schedules.

NO PRIORITY

Installations readily available.

THORNTON TANDEM CO.

8725-A GRINNELL AVENUE • Plaza 9700
DETROIT 13, MICHIGAN, U.S.A.

Investigate **THORNTON** *Automatic-Locking* **DIFFERENTIAL** for Replacement in Truck Axles

In Canada see: **H. V. WELLES, LTD.**, Windsor

Thornton Tandem Co.
8725-A Grinnell Avenue
Detroit 13, Michigan, U.S.A.

Please send me catalog of facts on changing my 1½-2 ton truck into a heavy duty truck.

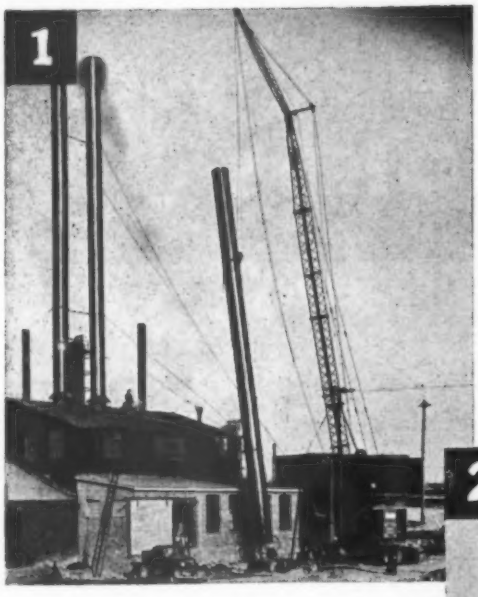
Name_____

Address_____

City_____ State_____

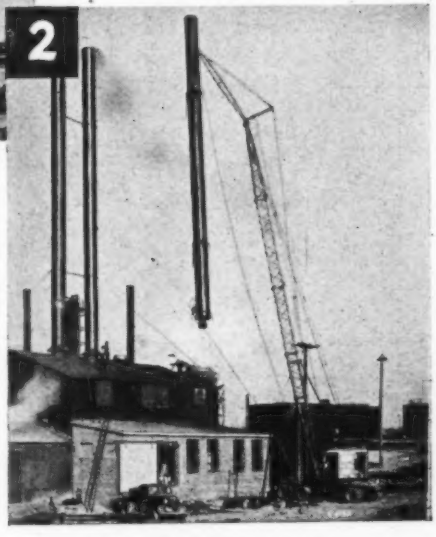
Make of Truck_____ Year_____

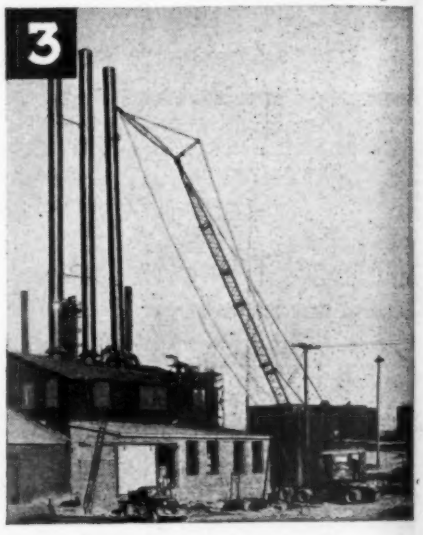
Used for_____



"Can't Say Enough for General Supercrane"

says Henry Selinsky





READY

Here's how easily and economically Contractor Henry Selinsky handles an 80-foot, 3-ton stack with his GENERAL Supercrane, equipped with 100-foot boom.

IN THE AIR

COMPLETE

Resourceful use of his rubber-tired, one engine, one man-operated GENERAL Supercrane is an everyday occurrence with Contractor Henry Selinsky, of Canton, Ohio. For example—

After a hurricane leveled part of a war plant, Selinsky added an extra 50 feet of boom and passed new girders over other buildings (in which war production continued) to complete the new structure in record time.

This 100-foot boom also made quick work of the setting of a new 80-foot, 3-ton stack (as pictured above) and on another war plant job, he handled 13-ton storage tanks fast and accurately, working at an 18-foot radius with his Supercrane.

These are typical of how easily and economically the toughest jobs are handled by General Supercranes. Of GENERAL'S dependability and versatility, Selinsky writes: "I can't say enough for the General . . . it's a real crane." For all the aggressive contractors like Henry Selinsky, General has developed the Supercrane one step farther in engineering the "Machine of Tomorrow" which will set new standards of performance in post-war materials handling and construction-excavating fields.

THE OSGOOD COMPANY
SHOVELS, DRAGLINES
CRANES
CRAWLER & WHEEL MOUNTS
DIESEL, OIL, GAS, ELECTRIC

Associated with The Osgood Company

GENERAL EXCAVATOR CO.

CRANES-SHOVELS MARION OHIO USA GENERAL OSGOOD

MARION, OHIO

GENERAL
CRANES, DRAGLINES
AND SHOVELS
DIESEL, GAS, ELECTRIC

IN THE high tide of invasion, east and west, thousands of International Diesel Tractors are serving the Army, the Navy, the Marine Corps, and the Air Forces. On many a battle-front these tractors play a fighting part in the drama of tanks and ships and fighting men.

Take Guadalcanal. In the tense hours of that first invasion it was *do or die* on the airstrip. International Diesels went ashore with their bull-dozers . . . filled in craters as fast as enemy bombs dug them . . . did combat duty to help the Marines cling to the toehold that gave us Henderson Field. Many a tractor operator died there, under fire, but the great Pacific Offensive was on.

It is the year of decision—overseas and over here. This year many thousands of tractor operators on the home front will come to close grips with the warning: *Take care of that equipment! Make it last! Make it do!* Harvester and the International Industrial Power Distributors stand ready to see you through. If your need for new equipment is vital to the war effort, we will have equipment for you. If your need is less vital, we will safeguard your present International Power with every service aid at our command.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

Fight with your blood—Give to the Blood Bank *Fight* with your money—Buy EXTRA Bonds *Fight* on the Food Front—Start with Your War Garden *Fight* the hidden enemy—Fight INFLATION!

INTERNATIONAL HARVESTER

Power for Victory

HOUGH

"HUFF" Tractor Shovels

Road Sweepers

Hough Cable-Operated Shovel on an International tractor. Hough also builds hydraulic loaders and shovels for use on International wheeled tractors, and hydraulic and cable-operated loaders and shovels for use on crawler type Allis-Chalmers and wheel type Case tractors.

Hough Payloaders and Hydraulic Shovels have an enviable name—earned in hundreds of applications—for minimizing the time required to handle bulk materials. Their speedy performances in military service helped us to win our "E" flag. Still more gratifying to owners is the extent to which they reduce the time and cost of moving dirt, sand, crushed stone, snow and many other bulk materials.

Back of speedy and economical performance in picking up, carrying, loading and leveling is the field-proved design and construction experience of a quarter-century and more than 3,500 machines in service. The Hough hydraulic system is extremely simple and foolproof; the bucket automatically stops at its highest and lowest positions. Full operating control is centered in a single lever. The bucket can be dumped at any level. Correct design, weight distribution and inbuilt ruggedness account for the fact that many Houghs six, eight and ten years old are still in daily operation. Nationally known users operate fleets of up to twenty Hough Tractor Loaders.

A Few Typical Uses for Hough Tractor Loaders

***By Road Contractors:** for sub-grading, leveling, charging concrete mixers and black top machines, loading or spreading materials, trimming shoulders, digging basements, inside forms and under viaducts, etc.*

***By Highway Departments:** for road maintenance, loading stone, sand and gravel, loading from pits, stock piles, snow loading, etc.*

***By Counties:** for road maintenance, charging black top machines, handling sand and gravel, stock piling, snow removal, etc.*

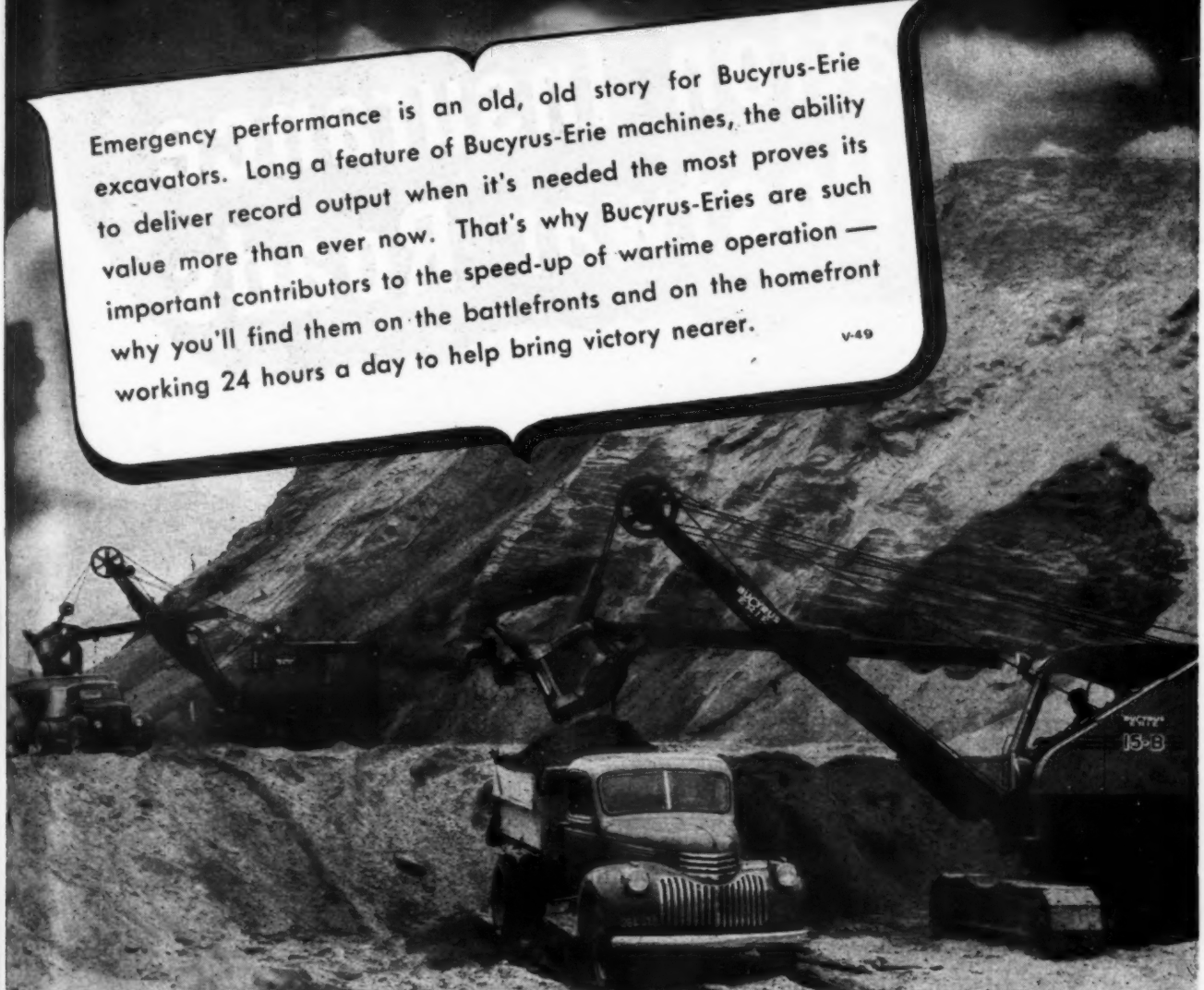
THE FRANK G. HOUGH CO.

Libertyville, Illinois **"Since 1920"**

OVER 3,500 HOUGH TRACTOR SHOVELS IN SERVICE

DELIVERING...
When the Chips are Down

Emergency performance is an old, old story for Bucyrus-Erie excavators. Long a feature of Bucyrus-Erie machines, the ability to deliver record output when it's needed the most proves its value more than ever now. That's why Bucyrus-Eries are such important contributors to the speed-up of wartime operation — why you'll find them on the battlefronts and on the homefront working 24 hours a day to help bring victory nearer. V-49

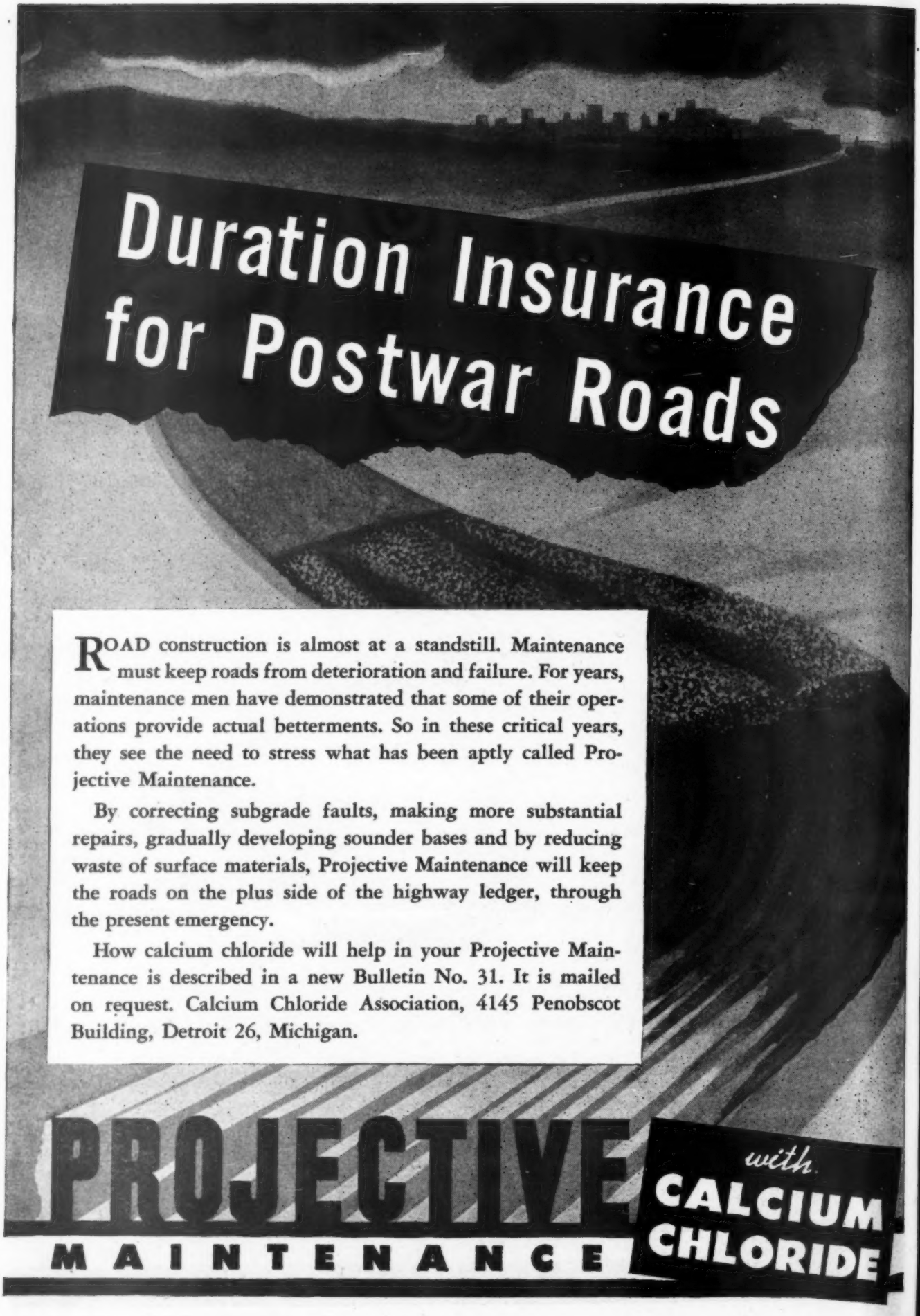


Plan now to include field-proved Bucyrus-Erie quality and performance in your equipment. Whatever your excavating need, there's a Bucyrus-Erie excavator to fill it — shovels, draglines, cranes, dragshovels, etc. for low cost, high output service.

ARMY E NAVY

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.


Duration Insurance
for Postwar Roads
ROAD construction is almost at a standstill. Maintenance must keep roads from deterioration and failure. For years, maintenance men have demonstrated that some of their operations provide actual betterments. So in these critical years, they see the need to stress what has been aptly called Projective Maintenance.
By correcting subgrade faults, making more substantial repairs, gradually developing sounder bases and by reducing waste of surface materials, Projective Maintenance will keep the roads on the plus side of the highway ledger, through the present emergency.
How calcium chloride will help in your Projective Maintenance is described in a new Bulletin No. 31. It is mailed on request. Calcium Chloride Association, 4145 Penobscot Building, Detroit 26, Michigan.
PROJECTIVE
MAINTENANCE
with
CALCIUM
CHLORIDE

ROADS AND STREETS

June, 1944, Vol. 87, No. 6

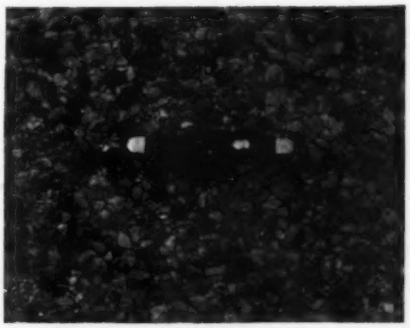
How It's Done in Texas

Texas Road Maintenance and Repair

Beginning a series of articles of the problems, methods and practices on the Texas State Highway Department

YES, Texas has frost troubles, too. Out in the Panhandle around Amarillo the state highway department this spring let $970,000 in contracts to repair winter damage. This is part of a $5,750,000 state-wide asphalt seal and resurface program which is the "big show" in a total 1944 maintenance outlay of nine million dollars.

Of the state's asphaltic program of 3,076 miles about 70 per cent is being let to contract. In contrast with the recent past, there are now plenty of contractors seeking work and a healthy competitive bidding has resulted in prices in keeping with those of pre-war years for similar work. Especially in regard to hot-mix asphaltic concrete, there is a noticeable increase in contractors with the equipment and experience for handling this type of construction, some having acquired plant facilities in connection with recent military contracts.



Note prevalence of above-½-in. particles, usually specified 20% to 50% of the chip materials

Seal Chips Closely Controlled

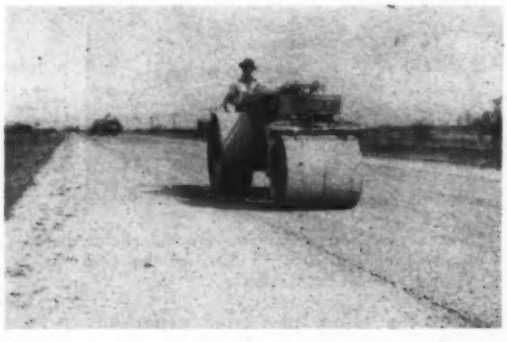
Sealing methods differ little from practices in other states, except that perhaps more than the usual attention has been given to chip specifications. Chips are specified to be graded from ¾-in. down to 10-mesh, with 20-50 per cent between ½ and ¾ in. Gravel when used is 50 per cent to 80 per cent crushed.

Too high a percentage of fines in the Texas climate leads to bleeding and embedding. When too little stone is above ½ in., experience is that the mat lacks wearing quality. Where gradation is just right the result is a "stone colored" rather than "black top" road, and one with a skid resistant surface good for 5 or 6 years of light or medium traffic with little maintenance.

An excellent example of seal treatment on U.S. 290 in West Texas

Chip gravel from a local pit was windrowed with a blade grader and loaded into trucks with this home-made labor saver, devised by the San Angelo district highway shop men. Mounted on a trailer chassis, it consists of a belt conveyor unit, small gasoline motor, and drum and clutch by which the operator draws a small drag-scoop through the stock pile and on to the belt while a second man guides the scoop

(Left): Loading distributor from 8,000 gal. semi-portable roadside asphalt storage tank, using superheater. (Middle): Beginning the day's distributor run. Application, .3 gal. per sq. yd. 230 pen. asphalt. (Right): Chip spreader crew putting down 1 cu. yd./100 sq. yds. of ¾-in. max. chip stone



(Left): Then came a light tow blade, which spreads chips uniformly in three or four passes. (Middle): The roller operator was right behind, but took care not to over-roll and break up large chip particles. (Right): Final operation: daily light dragging for several weeks, using an "X" drag made from sweeper broom sections

Typical Texas Hot Seal Job, U. S. 87 North of San Angelo

After the existing surface is broomed and 0.30 gal./59-yd. of hot AC seal (pen. 230-250) is applied, stone is put down by chip spreaders usually at rate of 1 cu. yd. to about 80 sq. yd. of surface. In some instances where local materials run to smaller maximum size, the spread is made as thin as 120 sq. yd. The idea is to put on as much material as can be made to stay.

Then comes the step most important in getting a smooth riding road, that of blading. A light tow-blade, manned by an experienced operator, spreads and skims the chips evenly in three or four passes, and the roller operator goes over immediately, taking care not to over-roll and break up large stone particles.

Thereafter the road is dragged daily for a couple of weeks, working in the afternoon when the asphalt has softened, using a light broom drag hitched to a farm tractor.

Sealing currently costs about $700 to $800 a mile, depending partly on availability of aggregates. In connection with force-account seal work the state owns one fairly large portable crushing plant, which is set up where needed for stockpiling.

Wartime Repair Method

This year several hundred miles of bituminous macadam roads which ordinarily might be more completely rebuilt are being salvaged and put in shape for the war period by the following procedure:

The old 16 or 18 ft. macadam road is scarified or left intact, depending on its condition. Shoulder turf is removed, shoulder gravel, stone or other stabilization material is bladed or scarified loose, and all good material from shoulders and scarified roadbed is spread to full crown width of the widened road, usually to about 30 ft. More crushed stone or gravel is dumped and spread as needed, and the road compacted with sheepsfoot rollers followed by several weeks of traffic consolidation and occasional attention with a skimming blade. Following this, the road is broomed and given a seal treatment.

This work usually requires 2,500 to 5,000 cu. yd. of gravel or caliche per mile and costs $3,000 to $5,000 a mile. It is done on roads that have become almost impossible to maintain, as a means of saving tires and wear and tear on vehicles. It is a type of work that has usually lent itself best to force account handling. Ac-

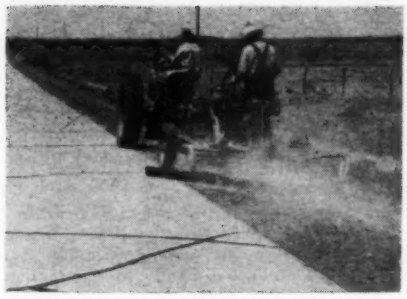
companying photos of U. S. 277 show work on the last 7-mile gap in a typical 60-mile project of this type, in which the old road was left unscarified over much of the distance.

Resurface Program

Asphaltic resurfaces in Texas include machine applied hot plant mix, rock asphalt, and road mix.

Hot-mix asphaltic concrete resurface or "blanket" 1 to 1½ in. thick (plus) has been prescribed this year for about 309 miles of asphalt or concrete surfaces, a considerably larger use of this type than in the past. These projects include pavements which have deteriorated beyond economic patching, and some concrete pavements which have developed pumping joints due to excessive loads. In nearly all cases widening strips are built and the resurface laid to width of 22 ft. or more.

After patching and placement of leveling course where needed, the surface is broomed, and topping mechanically spread in either two or three lanes. Eight and 10-ton rollers roll to 93 per cent of laboratory density or better.



Blading or skimming of Texas road shoulders is speeded by use of a supplementary blade which throws loose material back against the pavement edge

About 15 or 20 per cent of the state's 1944 repair appropriation is being concentrated in the Panhandle, where ice and snow from four severe freezes last winter caused extensive damage. Eleven resurfacing contracts, from 3 to 26 miles each, are under way in the Amarillo area. Winter damage is often traced to windrowed snow on shoulders, which melted and seeped into the subgrade.

The rest of the 1944 resurface program is widely scattered over the state, much going to repair damage from extensive army maneuvers and concentrated traffic near camps and war-crowded cities.

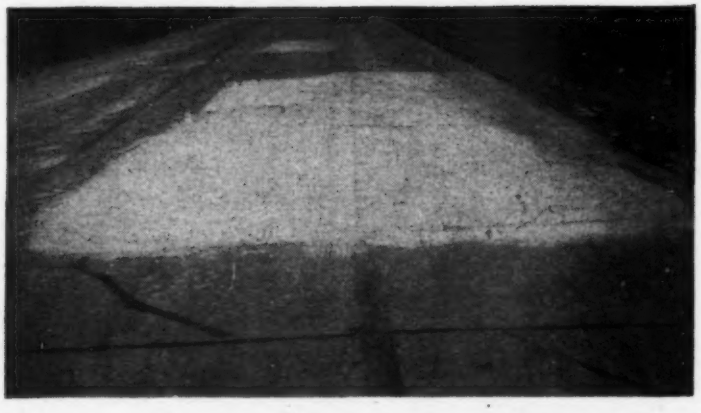
Concrete Patching

In some districts a considerable amount of concrete pavement repair work is in progress. Nine mudjacking crews are out. Mudjacking with soil-cement, soil-asphalt or other mixtures is used principally for stabilizing the subgrade under pumping joints.

Several new mudjacking machines, after long delayed delivery, are at work. Concrete patching follows usual practice, which includes cutting away failed areas with air hammers, excavating subgrade material several inches down, replacing with 6-in. sand cushion, and placing concrete of the same thickness as the old pavement. Concrete patching is done extensively on roads which may be relocated after the war. This work, incidentally, is being performed

Repairing Concrete on U. S. 80 West of Abilene

(Upper left): Jackhammers handle the work alone on this small job. A truck-mounted pavement breaker is often used on concrete patching in Texas. (Upper right): Subgrade under area to be patched was excavated 6 in. down (any unsatisfactory material further replaced). Broken concrete in this instance was loaded into trucks by hand and hauled to a central dump for running through a small portable crusher as patching aggregates. (Lower left): Six inches of sand was spread, and concrete patch placed to same depth as surrounding pavement. (Lower right): A finished patch—nice job



(Left): Culverts along the old 18-ft., narrow shouldered road were first extended to provide for 36-ft. of width shoulder to shoulder. (Middle): Up to 2,500 cu. yd. per mile of new aggregate was spread and rolled after scarifying shoulder gravel. Where old bituminous macadam was badly worn or partly disintegrated, it was also scarified as the first preliminary. (Right): Plenty of sprinkling needed in west Texas on compaction work. Luckily a creek was handy to this section of the job

(Left): An ancient elevating grader peeled up caliche from a roadside borrow pit (Right): Filling sprinkler from a nearby creek

The completed caliche undergoing traffic consolidation before sealing

Wartime Road Salvage Project, U. S. 277, Tom Green County, Texas

by state forces currently at about $3.50 per sq. yd.

State Taking Over City Streets

The state highway department has had its maintenance responsibilities increased in two directions. From time to time sections of farm-to-market highway not on the state system are taken over for maintenance and betterment. This is done at the request of the county highway commission, which may lack funds or facilities for the job.

More important is the recent taking over for maintenance of certain city streets. Up to October, 1943, the state maintained state routes only through municipalities of 2,500 pop. or under. Today state forces are gradually taking over maintenance of state arteries through cities up to 15,000 pop., and state routes in cities above this limit excluding sections through downtown or congested districts.

Four per cent of the state highway income has been allotted for this purpose. The procedure has been for district engineers to confer with city officials, and after inspecting the streets, agree to take over certain sections gradually. While the program is being handled informally, criteria are being worked out to insure uniform progress, so that one city won't feel that it is getting better state cooperation than another. The state is to maintain only the traveled roadway surface including gutters, excluding curbs, drainage, drive entrances, appurtenances, etc.

More Attention to Shoulders

The Texas highway system has generally excellent shoulder development; the traveler seldom, if ever, sees ruts along slab edges, for example. Without defining methods too rigidly the maintenance department has worked with district engineers to achieve increasingly better uniformity of results. Good turf or sodded shoulders have proved sufficient along pavements where traffic is not too heavy and soil has good stability when wet. Elsewhere, shoulders are quite generally built up with local gravel or stone. A light tractor-drawn skimmer, with supplementary blade for throwing material back up to the pavement edge, is widely used. This machine has the advantage of putting roughened or washed shoulders in good shape in one pass.

An 18-in. graveled or stabilized shoulder has been found to be a great maintenance and accident reducer along 18-ft. pavements, since it gives dual-tired trucks solid footing when turning out for passing.

Smooth Riding, the Aim

Highway department men take pride in the fact that state roads have been kept remarkably free of potholes in spite of wartime restrictions and shortages.

The 225 county maintenance foremen and their patrolmen and crews are constantly on the alert, with the realization that catching and patching bad spots quickly not only builds goodwill but saves tires, cars and even lives.

This year the shortage of trucks for transporting asphalt has been eased but worker shortage of course has become more serious. The normal summer complement of 8,000 to 10,000 state highway maintenance employes is down to 3,600. Scarcity of shop mechanics has laid up some equipment. Of course a great many maintenance jobs, especially weed cutting and roadside upkeep, have had to be neglected. Others, such as sign and centerstripe maintenance, are too vital to postpone. The watchword now is "Ingenuity." This ingredient is everywhere in evidence, in the form of short cuts and rigged-up labor saving devices.

M. B. Hodges is maintenance engineer and D. C. Greer, state highway engineer of Texas.

Texans, District Highway Engineers and Others, Snapped at the 1944 Highway Short Course, A & M College, Bryan

R. E. Kilmer, Dist. Engr., Pecos; Leo Ehlinger, Dist. Engr., Brownwood; Ed. F. Maddox, Sr., Res. Engr., Dallas; W. J. Van London, Dist. Engr., Houston; A. F. Moursund, Dist. Engr., San Angelo; Gibb Gilchrist, Pres. A. & M. College; T. E. Huffman, Dist. Engr., Dallas; J. A. Elliot, Dist. Engr., PRA, Ft. Worth; D. C. Greer, State Hy. Engr., Austin; Wallace Hazelwood, City Engr., Amarillo; Hugh Wallace, Dist. Engr., Asphalt Inst., Dallas

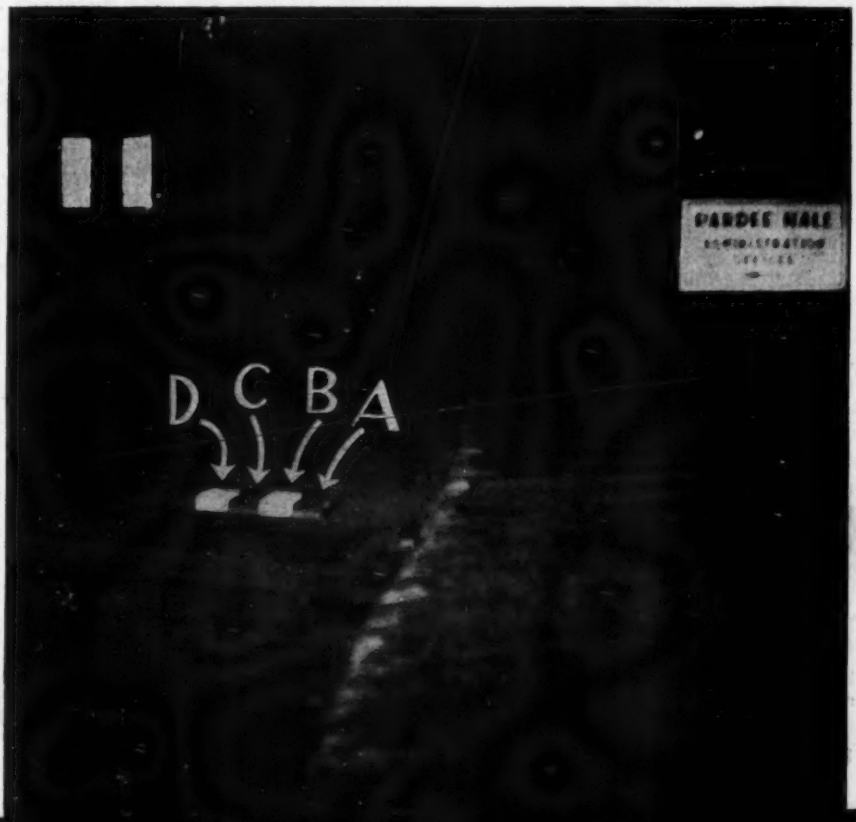
On the Texas job—Damond Whitaker, H. L. Taylor, A. F. Moursund, Mack Hodges, and Roy Smith

J. B. Nabers, Dist. Engr., Childress; P. S. Bailey, Dist. Engr., El Paso; D. Y. McDaniel, Co. Judge, McLennan Co., Waco; G. M. Garrett, Dist. Engr., Bryan; Manton Hannah, Co. Engr., McLennan Co., Waco; J. A. Orr, C.E. Dept., A. & M. College

Photo of Early Test of Pavement Reflecting Planes

LAST month in the article, "Tests on Night-Seeing Value of Reflecting Planes in Pavement," by Eugene C. Bingham of Lafayette College, Easton, Pa., an interesting photograph was inadvertently omitted. Shown herewith, it pictures the results of an early test made on the campus of Lafayette College on a macadam pavement. Using passenger car headlights at 50 ft., four different objects were laid side by side on the pavement and photographed: (A) At the right a board 4 ft. x 6 in. x 1 in. planed, painted with several coats of white paint; (B) next to it a concrete block 4 ft. x 6 in. x 2 in. with 16 ⅛-in. reflectors, the surface of the block being painted with several coats of aluminum paint; (C) A board similar to (A) but painted with several coats of black enamel paint; and (D) a block of concrete with reflectors like (B) except that it was painted with highly reflecting white enamel paint. In the first place, it is observed that the highway itself shows numerous lights and shadows indicating inequalities not ordinarily observed. The white board (A) is to our surprise considerably darker in hue than the black highway, because the latter is uneven enough so that surfaces return the light. The brightness of (A) and (C) and that of (B) and (D) are hardly to be distinguished, proving that the very great difference between (A) and (B) is not due to the paint used but much more to the presence of reflecting surfaces. It is very important to observe from this test that a smooth horizontal surface painted with white or black enamel paint are both alike nearly invisible. The building at the left is scarcely visible, but a sign at the right is illuminated well from the car because of its good orientation. But two windows above are seen brightly illuminated *from within*, but no more brightly than the reflectors of the concrete blocks, illuminated by the author's car here (B) or (D); this proves that if these reflectors covered the highway the entire highway would be highly lighted, but since the light would be evenly distributed, there would be no glare from the motorist's own headlights. Shadows would be exceptionally dark which would be of importance in the case of light colored objects. Pools of water or ice on the highway would appear black because reflecting like (A).

Fig. 7. Blocks A, B, C and D (right to left) used in an earlier test



New Post-War Road Bill H.R. 4915

Replacing bill H. R. 4953 (successor to H. R. 2426), introduced previously by Chairman Robinson, this bill authorizes $1,640,000,000 Federal aid over 3-year period, or less than the sum recommended under Upham and other plans

APPARENTLY reaching a compromise on many controversial provisions, the House Roads Committee on June 2 reported favorably H.R. 4915 embodying substantially the same provisions as H.R. 4953 introduced by Chairman Robinson on May 22. The bill as reported makes two fundamental changes in H.R. 4953:

(1) Provision is made that as soon as the funds for the first two post-war years have been apportioned the Commissioner of Public Roads is authorized to enter into agreements for the making of surveys and plans, the acquisition of rights-of-way, and for postwar construction. Such agreements constitute contractual obligations on the part of the Federal government for the payment of its pro rata share; and

(2) Apportionment of all funds is based on the Federal Highway Act of 1921 with the exception of changing the weight of the factors as follows—population ½, area ¼ and post road mileage ¼.

$1,640,000,000 Program Set Up

As the legislation stood on June 2, provision is made for a total three-year postwar highway program amounting to $1,640,250,000, broken down on an annual basis as follows:

Federal Aid System	$225,000,000
Secondary and Feeder Roads	125,000,000
Urban Highways	150,000,000
Forest Highways	25,000,000
Forest Development Roads	12,500,000
Parks and Monuments	4,250,000
Parkways	5,000,000
Total	$546,750,000

Funds for First Year Apportioned Immediately

Under the terms of the new bill funds for the first postwar fiscal year ending June 30 would be apportioned thirty days after passage of the act, while funds for the second and third years would not be apportioned until after the war (not later than Jan. 1 next preceding the beginning of each fiscal year). As soon as the funds for each of the first two post-war fiscal years have been apportioned, they will be available for making of surveys and plans and acquisition of rights-of-way, as well as for post-war construction projects. This would mean that not more than one-third of the total program could reach the commitment stage until after the war, which would limit immediate contract agreements for federal-aid highways, farm-to-market roads and urban streets to a total of $500,000,000.

Special Rule Required for House Consideration

Although the bill has been unanimously reported favorably by the Roads Committee, the legislative situation is such as to preclude House consideration without a special rule. Indications are that a special rule will perhaps be granted and that it would be possible to get the bill on the floor soon. According to reports many amendments will be offered when the bill reaches the floor of the House.

Additional Provisions

Following are other principal provisions, originally embodied in previous bill H.R. 4853, which remain in the new bill H.R. 4915.

1. Provides, that of the amount authorized for projects on the Federal-aid system each year, $225,000,000 shall be expended either inside or outside of municipalities; $125,000,000 for projects on principal secondary and feeder roads, including farm-to-market roads, rural free delivery mail and public school bus routes, either outside of municipalities or inside of municipalities of less than 10,000 pop.; and, $150,000,000 for projects on principal highways in urban areas on the Federal-aid system.

2. Limits the availability of the funds to two years after the date of the apportionment; any funds not taken up through agreement with the Commissioner of Public Roads at end of period of availability will lapse.

3. Makes funds authorized for the first postwar fiscal year available to pay 60% of the cost of any project, but for the second and third years the Federal share is restricted to the normal 50%.

4. Provides that the entire cost of projects for elimination of hazards of railway-highway crossings may be paid from Federal funds, but restricts to 50% the Federal participation in the costs of right-of-way and property damage on such projects.

5. Provides for the designation of a National System of Interstate Highways of not to exceed 40,000 miles to connect by routes as direct as practicable the principal metropolitan areas, cities and industrial centers.

6. Continues the provisions under which the state-wide highway planning surveys were conducted and permits the highway research necessary in connection with the planning of future construction with Federal-aid highway funds.

7. Provides for a resumption of the highway work in the national forests following the war. A 3-year postwar highway program is provided for by an authorization of $25,000,000 a year for forest highways and $12,500,000 a year for forest development roads and trails. Apportionment for forest highways in Alaska is $1,500,000 for each of the postwar years and the funds that would otherwise be apportioned to Alaska is to be divided among those States whose apportionment would otherwise be less than 1%.

8. Provides an authorization of $4,250,000 a year for each of the three successive postwar years for park roads and trails.

9. Provides for the construction and maintenance of parkways to give access to national parks and monuments, and authorizes for this purpose an appropriation of $5,000,000 a year for each three successive post-war years.

10. Authorizes the Commissioner of Public Roads to cooperate with the

Based on information from state highway commissioners in 11 key states, G. Donald Kennedy, ASF vice-president, told the American Society of Planning Officials in Chicago, that:

(a) a large city expressway construction program is assured in the immediate postwar period;
(b) metropolitan authorities are needed to coordinate local government planning;
(c) much state highway enabling legislation for city work can be expected in 1945 sessions;
(d) the origin-destination traffic surveys now under way in many cities will become in urban areas the basic approach to state-city highway planning.

Editorial

ONE of the most important reasons why this country imperatively needs a large post-war road program has been all but lost in the shuffle lately. That reason is *driving economy*. A reminder of the cash benefits of good pavements over poor is given in a bulletin issued by Mr. Upham of ARBA. Prior to the war the nation's annual bill for enjoying the use of motor cars and trucks ran to the astronomical total of 17½ billion dollars, or a sizable chunk of all we earned. Out of this, around 2½ billion was for construction and upkeep of roads and streets, or one dollar in seven. The "construction seventh" of the country's motoring bill has the power to bring about savings of a substantial percentage of the rest of the 17½ billion, in the form of lessened wear and tear on tires, reduced gas and oil consumption, lengthened life of vehicles, diminished accidents.

There have been differences of opinion as to just what percentage of gasoline you save on a modern paved road, compared to driving on wornout pavement or rough gravel, and how much you save in repair costs on the old family bus. But common sense tells us that the difference adds up pretty big in the end.

The old adage still holds. After the war we'll continue to pay for modern, adequate roads whether we have them or not.

WARNING: MORE DEATHS AHEAD

THE slight lull in traffic accident fatalities since Pearl Harbor isn't fooling anyone engaged in traffic control and safety work. When wartime travel restrictions are lifted and motorists can again step on the gas, the death toll is sure to shoot upward again. Norman C. Damon of the Automotive Safety Foundation, in warning of this fact at a recent safety conference at Dallas, reminded that state and local government agencies must plan now for control measures to handle the heavy increase in traffic after the war. Unless plans are ready to put into effect the first post-war year might easily see an additional 10,000 traffic deaths over present figures.

Building greater safety into the highways is another part of the post-war accident-prevention job, and it goes without saying that every question of roadway design that concerns safety should be settled on the side of making it harder for accidents to happen. G. Donald Kennedy of the Foundation emphasized safer highway construction as a long-range factor in permanently reducing accident rates.

Lest we all forget, the auto has been a greater killer of Americans than war. From Pearl Harbor to Jan. 1, 1944, according to Lumberman's Mutual Casualty Company, our war casualties of all types totaled 139,858, while traffic casualties were 1,954,000.

Enforcement, engineering, education to reduce the slaughter on our roads and streets—everything else should be secondary in highway post-war planning.

State highway departments and any Federal agency in the location, development, construction, and maintenance of flight strips to insure greater safety for traffic on the public highways and to provide needed facilities for the landing and take-off of aircraft.

11. Makes a desirable start in the direction of uniformity of traffic signals, signs, and markings by directing the Commissioner of Public Roads to concur only in such installations on Federal-aid projects as will promote the safe and efficient utilization of the highways.

HR 4915 Bill Held Short of Needs

WITH prospect of from nine to ten million more jobseekers than jobs after the war, the Federal highway aid bill 4915 as reported out on June 2 **falls short of meeting employment needs and urgent highway needs**, according to an analysis made by Charles M. Upham, engineer-director of the American Road Builders' Association.

Total Federal participation, with local matching funds, would provide only about $830,000,000 for the first year, and for the next two years $1,000,000,000 each.

While that is a large program, it is still out of line with the huge accumulation of road needs of the next few years which for state, county and city systems total about $16,000,000,000, Mr. Upham points out. To meet those needs $3,000,000,000 annually is required.

While the bill is financially disappointing, the outlook for action is encouraging.

In reporting it out the House Roads Committee, issued a comprehensive report which emphasized the urgency of Congress acting without delay. National policy must be clearly established, the report said, so that states can make "full progress in meeting the complex legal, financial and engineering problems which must be solved in advance if the post-war program is to be soundly planned," for nearly all of the state legislatures meet in biennial session in 1945.

Congressman J. W. Mott of Oregon, long a Committee member, said of this bill in part:

"I shall support H. R. 4195 solely for the reason that it is essential that legislation providing for a post-war highway construction program be enacted at this session of Congress. I feel constrained, however, to state here that the bill, as reported from committee, in my opinion, **is wholly inadequate to meet proven post-war highway needs. It is my opinion, further, that there is no sufficient reason or excuse for this inadequacy, because the entire testimony presented at the committee hearings clearly disclosed (1) that the minimum amount required for an adequate post-war highway program would be $1,000,000,000 per year for 3 years; and (2) that the financing of such a program would be economically feasible and would not result in an undue tax burden on the people who are to benefit by the legislation. . . . According to the testimony of [these] experts the authorization of only $500,000,000 a year would be but a pitiful approach to a problem of tremendous proportions.**"

Congressman Mott also pointed out that "Highway improvements may be

(*Continued on Page* 66)

Pittsburgh's Penn-Lincoln Parkway

Surveys and construction plans being pushed by consulting firm on this $20,000,000 plus, 9.3-mile expressway, one of Nation's outstanding urban post-war projects

ONE of the Nation's outstanding urban highway projects is fast reaching the blueprint stage in Pennsylvania. It is the long planned multi-million-dollar Penn-Lincoln Parkway, designed to eliminate the bottleneck in Pittsburgh's traffic congestion and join a regional network of boulevards and roadways in that area.

There are several reasons why engineering circles and roadbuilders from coast to coast are watching the designers and engineers shape this dream parkway into final plans for construction.

(1) It will be the largest project ever undertaken by the Commonwealth of Pennsylvania as a single construction operation.

(2) It represents one of the most complex parkway projects ever attempted. Designing this parkway for Pittsburgh's rugged and hilly terrain has been described by one Public Roads Administration official as "one of the most difficult engineering projects that has ever confronted their office."

(3) It holds extreme interest as an engineering project, as it contains nearly every problem in highway design, including intricate design of bridges, viaducts, railroad underpasses and overpasses, tunnels and tunnel operation buildings, difficult drainage, the establishment of grades and lines within the maximum limitation, complicated interchanges, and locating the Parkway through built-up areas, along rivers, and along railroads.

(4) Finally, the awarding of the State and Federal highway survey and design contract on this large post-war project to a private engineering firm in 1943 helped to set a precedent for the employment of outside consulting engineers on such work (the engineering firm in this instance is that of Michael Baker Jr., Rochester, Pa.).

To Pierce Downtown Pittsburgh

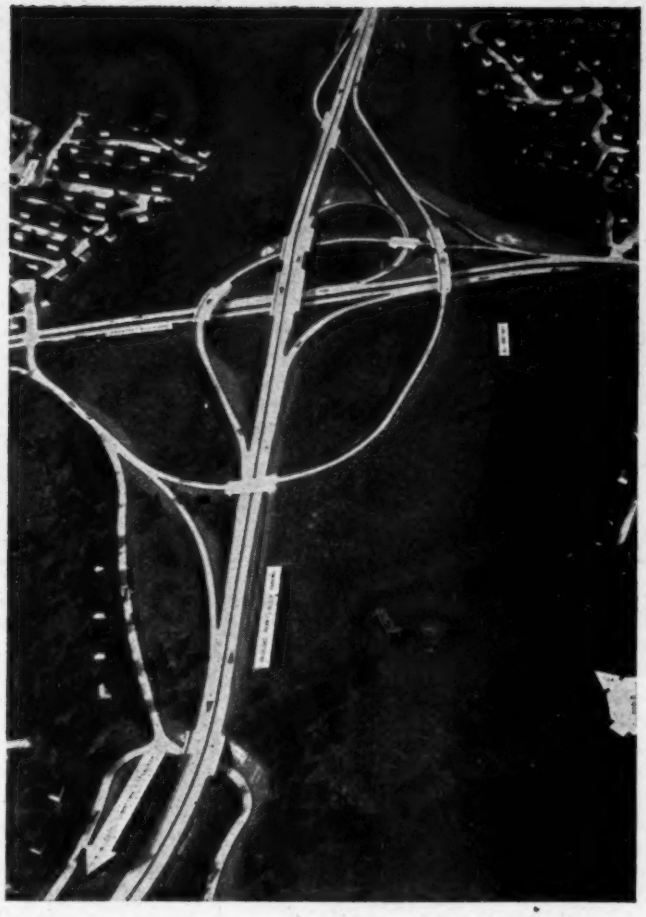
Stream-lined and 9.33 miles long, this modern 4 and 6-lane express thoroughfare will pick up two main national highways, the William Penn and the Lincoln (U. S. Route 22-30) east of Pittsburgh near Wilkinsburg, and carry them into the heart of Pittsburgh's Golden Triangle.

Benefits from this parkway, which has been the goal of Pittsburgh's traffic and planning experts for nearly 20 years, are manifold. Such a super freeway, connecting only with the chief traffic arteries in the eastern end of Pittsburgh, will speed the motorist to his downtown office with a maximum of efficiency, relieving the congestion that has tied this segment of the city's traffic into a tight knot for years. It has already been estimated that motorists using the new Parkway, instead of the maze of present streets, will save themselves each year more than $3,500,000 in value of time and distance saved.

Besides breaking up Pittsburgh's major traffic tangle, the Parkway is a part of the regional improvement program for the big Steel City. It will join Pittsburgh with the national highway system, by carrying U. S. Routes 22, 30, and the Pennsylvania Turnpike into the city in a more efficient manner. And, when the next logical step develops, a western ex-

Perspective of Pittsburgh's new "dream" Parkway, which will carry motor traffic over a streamlined highway from Wilkinsburg, where it connects with U. S. Routes 22 and 30 east of the city; then through a tunnel under Squirrel Hill; coming finally to the banks of the Monongahela River into the Golden Triangle near the Liberty Bridge interchange, most complicated intersection on the Parkway. (Note: Liberty Bridge is the fifth from the bottom of the picture going up the Monogahela River)

Graphic chart showing how construction of Pittsburgh's new Penn-Lincoln Parkway, now being surveyed and designed, will take up the slack of post-war unemployment and require thousands of tons of construction material



(At right): Topographical model of the busiest interchange, Lincoln Parkway at Ardmore Boulevard, where 22,400 cars are expected to come on and off the Parkway daily from the Lincoln Highway. Model scale 1 in. to 100 ft.

tension of the Parkway will shuttle through traffic toward the west, passing the new Moon Township Airport west of Pittsburgh.

4,350,000 Man-Hours Direct Employment

In addition, it is hoped this big post-war construction job will be ready to help cushion the unemployment shock for Pittsburgh after hostilities cease. The Penn-Lincoln Parkway will provide an estimated 4,350,000 man-hours of direct labor alone, not to mention that required in materials, production, etc. When originally planned, the project was estimated to cost approximately $20,000,000. It is now apparent that it may exceed this figure.

Anyone familiar with the Pittsburgh situation knows this superparkway did not blossom overnight. There was plenty of hard spade work done by many farsighted public spirited citizens who worked unceasingly to bring their dream to fulfillment. Cutting across many types of political subdivisions and sectional interests, this proposed parkway required years of careful guidance until all interests saw the advantage of such a thoroughfare and the dream finally reached the drafting stage.

One of the first men to think about the possibilities of such a parkway was E. L. Schmidt, now District Engineer for the Pennsylvania Department of Highways, who in 1926 when he was Chief Engineer for the Planning Division of Allegheny County, first talked of the idea. And he has been talking about it ever since, until today under his supervision it is taking form.

An early pioneer in advancing this highway was Park H. Martin, present Director of Planning for the County of Allegheny. Willard H. Buente, Chief Engineer of the City Planning Commission in Pittsburgh, has also advocated the importance of the Parkway.

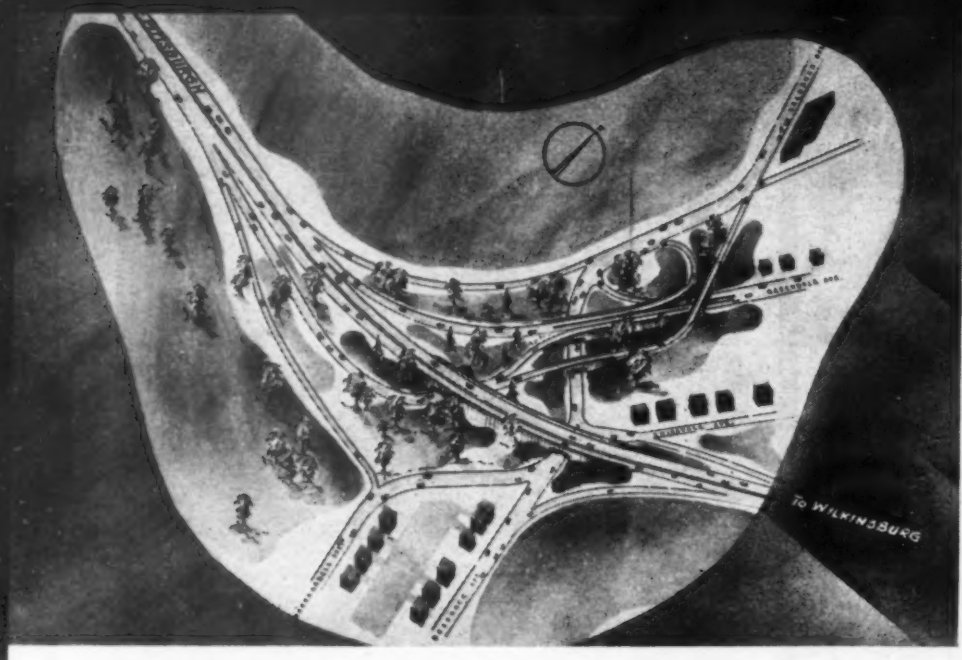
In 1939, the Pittsburgh Regional Planning Association joined the fight for the Parkway. And when Pennsylvania's present Secretary of Highways, John U. Shroyer, realized how much the removal of Pittsburgh's traffic jam in the eastern part of that city would permit an uninterrupted flow of State-wide traffic, he also supported this project as the first major step in the Commonwealth's $500,000,000 post-war roadbuilding program.

Meanwhile, the Public Roads Administration, as a result of the studies that terminated in its Toll Roads report, saw the wisdom of fitting such a modern freeway into the Federal highway system by using it to gain a high fluidity of vehicular movement over the William Penn and Lincoln Highways into and out of Pittsburgh. No longer were national highways to by-pass metropolitan areas, but instead were to sweep into the center of these cities, allowing limited access to the freeway only at the most strategic locations.

Consulting Firm Appointed

The various communities and agencies affected were all agreed on the route. And Pittsburgh, anxious to see this civic improvement get started, gave it the go-ahead signal. The PRA and the State were ready to finance the preparation of plans for the project. Like many State departments, the Pennsylvania Department of Highways had been hard hit by the war, and it was decided to capitalize on the availability of a consulting firm, with engineering staff ready to move the Parkway into the construction bidding phase. The Baker firm, awarded the design work, started on December 20, 1943, agreeing to complete the survey and plans within ten months.

Associated with Mr. Baker in designing $4,500,000 worth of bridges, viaducts, and underpasses for the Penn-Lincoln Parkway is George S. Richardson, consulting engineer of



One of the five interchanges on Pittsburgh's new Penn-Lincoln Parkway is that at Braddock Avenue

Pittsburgh and an outstanding authority on structural design. Ole Singstad, consulting engineer and Chief Engineer on the New York Tunnel Authority, is Mr. Baker's consultant on the Parkway's $4,000,000 ventilated twin-tube tunnel designed to take the Parkway under Pittsburgh's residential Squirrel Hill.

Blueprinting Moves Ahead

To date, plans for the Parkway are moving along on schedule. An intricate and comprehensive "Progress Chart" keeps the entire job under control and shows at a glance exactly how much has been completed on any phase of the Parkway. It reveals that the field construction on this project totals 36% of the engineering work, design construction 64%.

The Pennsylvania Turnpike, which crosses many open fields, was a comparatively simple project compared to the alignment, survey, and planning along the Penn-Lincoln Parkway which must meet city streets and existing roads, ravines, housing developments, railroads, trolley lines, rivers and high office buildings.

Some idea of the rugged terrain through which the Penn-Lincoln Parkway is to pass may be gleaned from the fact that Pittsburgh has often been described as "The City of Bridges." Its highways must cross many ravines. The route of the "dream" Parkway is no exception. The countryside through which the Parkway line is now being surveyed is extremely rough; hillsides are steep, valleys narrow and deep.

To make surveys more difficult, the Parkway center line had to be coordinated into the coordinate system of the City of Pittsburgh. This has required extremely precise surveying on the part of the field corps.

Design Criteria, an Important Decision

After considerable study, it was decided that such a highway, regardless of topographical conditions, could only be justified with satisfactory alignment and gradient at reasonable cost. On the main Parkway itself, it has been decided that a maximum gradient of 5% should be used and the horizontal curvature shall not be in excess of 4 degrees.

The Parkway is to be 4-lane (minimum) from the eastern end (at William Penn Interchange near Wilkinsburg) to the Squirrel Hill Tunnel. Leaving the west tunnel portal, from the Forward Avenue interchange to the Grant Street destination in downtown Pittsburgh, it will be 6 lanes to accommodate the increasing traffic load.

The four lanes east of the tunnel will each be 12 ft., each direction, with 10-ft. berms or shoulders. West of the tunnel, the 6 lanes will also be 12 ft.; except where curb construction is required, where an additional 2 feet of paving will be provided on each side of outer traffic lanes. A 120-ft. right-of-way will permit landscaping, where possible and desired.

There will be a median strip of 4 ft. minimum width. For more economical construction and sometimes to avoid monotony to the operators of motor vehicles, the opposing traffic lanes will, where topographical conditions permit, be more widely separated. In some cases the two roadways may be at different elevations.

Heavy Traffic Volume

An enormous flow of traffic will use the Parkway. Each lane has been designed to take care of 1,100 cars per hour, with a safe braking distance between cars. In other words, the three inbound lanes on the Parkway could pour 3,300 cars per hour into downtown Pittsburgh. The heaviest peak load so far estimated is 2,470 an hour.

Traffic counts show that 9,000 cars will come on and off the Parkway daily at the William Penn interchange; at the Ardmore Boulevard interchange, 22,400 more from the Lincoln Highway; at the Braddock interchange 8,600 more; at Forward Avenue interchange 9,400 more; and at the Liberty Bridge interchange 6,600, so that by the end of the day the Parkway will have brought into and out of Pittsburgh's Golden Triangle, a total of 56,000 motor vehicles.

Complex Interchange Design

Due to the narrow valleys and thickly settled areas adjacent to this thoroughfare, and the steep grades on nearby streets, the Parkway's five interchanges have presented about as complex design problems as are ever faced by a highway engineer. Numerous studies, models, and photographs have been made before final details chosen. Interchanges are located at or in the vicinity of existing major traffic arteries, so as to provide for local traffic to and from downtown Pittsburgh and effective dispersal over existing highways.

Particularly interesting and difficult construction will be required near the Golden Triangle itself, where a complete interchange will be provided at the Liberty Bridge crossing of the Monongahela River. This latter structure will be part of another important traffic artery known as the Crosstown Parkway,* which when completed will provide a more thorough dispersal of traffic in the congested downtown area of Pittsburgh.

Lifting traffic from the Parkway to the Liberty Bridge level, a rise of 70 feet, and still keeping the proper grades while working within a limited space cramped by bridges, ramps, and high buildings in the Golden Triangle, is perhaps the most difficult engineering puzzle along the entire Parkway. This particular in-

*The Crosstown Parkway is another of Pittsburgh's "number one" projects in its post-war regional improvement program, according to Wallace Richards, executive secretary of the Pittsburgh Regional Planning Association, which has been extremely instrumental in bringing the Penn-Lincoln Parkway into the realms of reality.

terchange problem has, according to Engineer Schmidt, "been worked on by more men during the past eight years than any project I know of."

The Ardmore Boulevard interchange will handle the largest traffic volume coming on and off the Parkway at any one spot, an estimated 22,400 vehicles daily (1951 forecast) will enter and leave here. Six different detailed studies were made before a final design was selected. The interchange will include eight structures.

This flow from the Lincoln Highway or Ardmore Boulevard, and adjacent sections will be able to move onto the Penn-Lincoln Parkway and proceed downtown, making the average trip from home to office in 11 minutes instead of the 24 minutes it now takes through the winding tortuous streets of the eastern area of Pittburgh. There will be no traffic light hold-ups, and the Parkway is designed to accommodate the maximum legal speed limit. In other words, it will be possible to make the 8 miles downtown in about 11 minutes from the Ardmore interchange, as there are only two more interchanges between that point and the last one at Liberty Bridge.

The design of the Forward Avenue interchange is also an intricate one, as there are hills all around and little room to design long ramps to and from the Parkway. Homestead, near this point, is thickly populated. Since many of its people work in Pittsburgh, this interchange is also well situated.

"Visible" Design of Bridge Railings

Ordinarily when a motorist drives over a bridge and looks toward the railing, pickets flash by his eyes obstructing his vision; or the railings may be solid and high, shutting out all view. However, the horizontal treatment on the railing parapets of the Parkway bridges will permit the motorist's vision to travel through unobstructed, with only a brace appearing now and then. He can also see over the top of the railing at all times. The railings are wide enough to look through but still safe enough to prevent a child from falling through.

Some of the viaducts along the Parkway will be 80 to 100 ft. high; one 1,500 ft. long. Where the Parkway passes over the Valley of Nine Mile Run and Commercial Avenue adjacent to beautiful Frick Park, an 850-ft. viaduct is planned with a maximum elevation of 100 ft. above the floor of the valley. After leaving the Commercial Avenue viaduct, the Parkway enters the eastern portal of the Squirrel Hill Tunnel, which is 4,000 ft. long.

Tunnel Features

At both the east and west portals of this tunnel, there will be control buildings for operating ultra modern ventilating equipment and a garage at each end for the operation crews, their fire and police buggies, and the maintenance crew. Each tunnel tube will have two 12-ft. lanes plus a 3-ft. sidewalk.

The improved ventilating equipment is designed with special precautions against fire hazards by using a reversible control. This combined vertical and longitudinal reversible system makes it possible to reverse the operation and get smoke out in an emergency. Another safety feature in the tunnel is a device which measures carbon monoxide content and removes it in take-off tubes at appropriate points.

The tunnel lighting design eliminates all shadows and gives uniform, even light distribution. It also has another unique feature. This is the intensive lighting just inside the tunnel, which will aid the motorist in adjusting his vision from bright sunlight to the artificial light within. The intensive lighting is graduated to the regular lighting over a distance of 250 feet within the tunnel.

Property Damage as a Route Factor

A factor considered in the final choice of the Parkway was the question of property damages. At one time the Parkway was planned for a more heavily built-up section of the city and not so near the river. But this idea was abandoned when it was seen that the property damages entailed in the first route would be prohibitive. The final route selected takes advantage of all possible open areas and valleys, with a minimum of property damages.

In going through the ravines to avoid expensive property destruction, many drainage problems have arisen, such as taking care of flood waters through culverts and bridges. At the Braddock Avenue interchange a stream will have to be put underground and sanitary and storm sewers constructed. On other stretches of the Parkway special treatment of drainage along the highway eliminates unsightly ditches.

There will be maximum cuts of 72 ft. and fills of more than 80 ft. along the Parkway route. Care is being taken through proper design and analysis to establish the grades to balance the cut and fill sections as nearly as possible and thus reduce costs.

Soil tests are being made in all cuts to discover and determine the soil and rock classification. Depending on the material found and its stability, it is then possible to establish the proper rate of slopes in cuts and fills, thus reducing erosion. Test borings on the eastern part of the Parkway have located coal seams, some of which have been worked in past years and must be given proper consideration in the design of grade lines to prevent future settlement of the highway.

Huge retaining walls are now designed. Walls will have to be built particularly along the harbor lines. Here, as the Parkway reaches its downtown destination, it follows close along the river line adjacent to the harbor line outside the docks and railroads, hugging the shore and passing under the Tenth Street bridge. There one ramp will begin for connection with the Liberty bridge and the Crosstown Parkway.

Plans for construction of the Penn-Lincoln Parkway are expected to be complete late this year, and when they are Pittsburgh will have on its shelf

Interesting engineering problem along the route of Pittsburgh's new Penn-Lincoln Parkway is that of raising one end (left shown here) of a motor vehicle bridge high enough to let the Parkway go beneath it and still be high enough above the railroad tracks to permit trains to pass below the Parkway

Examining Penn-Lincoln Parkway plans done so far: Stanton C. Funk, assistant project engineer; Wayne D. Meyers, project engineer; C. H. Buckius, chief engineer of the state highway department; Mr. Shroyer, secretary of highways; E. L. Schmidt, district engineer for the state; Michael Baker, Jr.; and Christian Eben, chief engineer of the Baker organization

blueprints for one of the largest post-war projects in the country.

And the Parkway has been so designed that each of six sections is complete in itself. For example, it would be possible to advertise for construction bids on the roadway from the William Penn interchange to the Ardmore Boulevard interchange and link up the Penn and Lincoln Highways while designs were still being completed on the downtown section of the Parkway from Tenth to Smithfield Streets.

Many Agencies Cooperating

Among the many agencies which have aided in bringing the Penn-Lincoln Parkway past the dream stage into the blueprint stage are the following:

COUNTY COMMISSIONERS — John Kane, John Herron, and George Rankin, as well as the Traffic Division of Allegheny County and Donald McNeil, director of the Traffic Planning bureau for city of Pittsburgh, which has furnished available traffic volume data.

THE ALLEGHENY COUNTY PLANNING COMMISSION—T. H. Hester, Chairman; Frank L. Palmer; Theodore Eichols; W. D. Mansfield; Park H. Martin, director; Bernard H. Goodwin; George M. Wilson; Charles P. Howe; Mrs. George Bray; Charles Shenot; and Harry W. Fowler, Prin. Asst. Engineer.

THE CITY PLANNING COMMISSION—Frederick Bigger, chairman; Charles F. Lewis, vice chairman; John W. Towns, secretary; Willard H. Buente, chief engineer; Donald D. Reed; S. J. Hovde; Charles T. Ingham; Martin C. Mihm; J. P. Watson; and Ronald Woods, city planner.

THE PITTSBURGH REGIONAL PLANNING ASSOCIATION—Col. Richard K. Mellon, President; Joseph Dilworth, Vice President; Arthur E. Braun, Treasurer; Wallace Richards, Secretary; the Executive Committee also includes George R. Hann; Edgar J. Kaufmann; H. E. Lewis; and L. W. Monteverde.

The efforts of all these groups have been guided by a coordinating committee known as the Technical Committee on Pittsburgh's Major Improvements Program, membership of which follows:

E. L. Schmidt, chairman and District Engineer for the Pennsylvania Department of Highways; Park Martin, Director of Planning for Allegheny County; Willard H. Buente, Chief Engineer for the City Planning Commission; Donald McNeil, Traffic Engineer for the Bureau of Traffic Planning of the City of Pittsburgh; Frank M. Roessing, Director, the City Public Works Department; John B. Sweeney, Director of Allegheny County's Department of Public Works; and Wallace Richards, Executive Secretary of the Pittsburgh Regional Planning Association.

The Public Roads Administration officials handling the Penn-Lincoln Parkway include:

C. E. Swain, District Engineer (District 10), E. H. Karrer, Bridge Engineer, Joseph Barnett, Secretary Committee on Design Policies, A.A.S.H.O., all of Washington, D. C.; H. R. Leland, Senior Highway Engineer, J. L. Stinson and N. D. McDowell, Associate Highway Engineers, all of Harrisburg.

Those from the Pennsylvania Department of Highways guiding the progress of the Parkway for this Commonwealth include:

John U. Shroyer, Secretary; Charles H. Buckius, Chief Engineer; John Heber; Thomas Baker; Leo Porter, Bridge Engineer; Ben Forbes, Division Engineer; E. L. Schmidt, District Engineer; John Yard, Assistant District Engineer.

The Baker engineers on the Parkway project are: Michael Baker, Jr., Consulting Engineer; George S. Richardson, Consultant and Associate on Structures; Ole Singstad, Consultant and Associate on Tunnels; Christian F. Eben, Chief Engineer of Firm; Wayne D. Meyers, Project Engineer, Penn-Lincoln Project; Stanton C. Funk, Assistant Project Engineer; H. Hanchett, Chief of Field Surveys; J. M. Kantner, Chief Designer, and James Rooney, Chief Tunnel Designer.

Creation of Federal Transportation Authority Recommended

The Transportation Board of Investigation and Research in a preliminary report to Congress on the "Relative Economy and Fitness of Carriers" recommended:

1. Establishment of reasonable joint routes and rates for carriers by highway, rail and water.

2. Immediate creation of a Federal Transportation Authority to make continuous transportation studies.

3. Creation of an Office of Public Transportation Counsel to represent public interest.

4. Creation of a National Transportation Advisory Council composed of representatives of transportation, labor, finance, agriculture, industry and "public service" to make reports and recommendations on national transportation policies.

Bill H. R. 4915

(*Continued from page* 61)

truly classed as self-liquidating projects, and according to competent authorities, receipts from Federal excise taxes during the post-war period will be sufficient to meet the expenses of a program twice the size of the one contemplated under H. R. 4915.

In fact, the amount provided in H. R. 4915 would not even equal the annual rate of Federal collections from highway users based on the 1942 level. For the fiscal year 1942 the receipts from Federal excise taxes on motor vehicles, gasoline, oil, etc., totaled $626,327,000, or over $126,000,000 more than the annual amounts authorized in H. R. 4915. There is no question but that the number of vehicles and vehicle use will increase substantially following the war. This, of course, means substantially increased returns to the Federal Goverment from the various taxes now levied on motor vehicles and motor-vehicle use.

"Accordingly, the amounts of Federal aid provided in H. R. 4915 are protested as being wholly inadequate and the recommendation is made that Federal aid for post-war highway construction should be fixed and the recommendation is made that Federal aid for post-war highway construction should be fixed at the minimum of $1,000,000,000 per year."

Fails to Utilize County and City Talent

Another serious weakness of the bill, Mr. Upham believes, is the failure to utilize the engineering facilities of county and city highway departments. No provision is made for counties or cities to serve in more than an advisory capacity; they cannot supervise construction or in any way directly handle or control projects involving Federal aid.

"There are hundreds of city and county highway departments which are staffed by competent engineers," Mr. Upham commented. "The job ahead is so great it would be extremely short-sighted to eliminate local road agencies. To adequately meet the demands of post-war traffic, to get a spread of employment, and to best serve local needs, every capable highway agency must be called into action.

"In this connection, the bill confines funds for urban construction to the Federal-aid system. That is unfortunate since in many cities relief arteries are needed which parallel existing Federal routes. In many cases, connections to the Federal routes are as important as the routes themselves."

When Flood Sweeps a City

Notes on Wichita's recent record flood, and how rescue work was organized and damaged pavements are to be repaired

By P. L. BROCKWAY
City Engineer, Wichita, Kansas

THREE streams flow through Wichita, the smaller one, Chisholm Creek which has been replaced through the city with a canal, having a drainage area of about 80 sq. mi., mostly hilly and with rapid runoff.

In a 24-hour period, on April 21-22, five to seven inches of rain fell over practically the entire drainage area on ground already saturated.

The drainage canal through the city was full to overflowing on April 22. The tremendous discharge from above the city swept across the valley, with a flooded width of nearly three miles; came down through the city, being influenced by some railroad grades, and unable to discharge into the already full canal, followed the route of an old swale entirely through the city; reached the peak at about eleven o'clock at night as it crossed the main east-west street through the center of town, continuing south and discharging back into the canal at the lower limits of the city.

A confusion of cross currents developed, some as much as 4 feet in residential and business areas adjacent to the main highway. Absence of trash lines made it hard to tell direction of flow at any individual location.

This flood came so rapidly that there was no possibility of warning and, in fact, no previous history of such rainfalls and runoff on which to base warnings. The canal itself was effective enough that the water had all been drained off by daylight the morning of the 23rd.

In the meantime, headwaters of the Little Arkansas River, which is about 100 miles long, entered into the upper portion of the valley already flooded by the Chisholm Creek discharge. The air picture taken from the Civilian Air Patrol plane gives a pretty good bird's-eye view of that situation.

How Relief Was Organized

The Weather Bureau gave flood warnings of unusually high flood of the Little River down through the valley and into the city. These predictions were fulfilled in that the flood plane was higher in the channel than any previously recorded flood by as much as two feet.

Evacuation work was organized early under the direction of the Civilian Defense. The Control Center was opened and kept in operation continuously for two or three days. The Fire Department of the city assisted in evacuation. The army sent down amphibious equipment from an army camp about one hundred miles away. Auxiliary police and auxiliary firemen were called out to help in rescue work and to direct traffic to prevent undue traffic congestion. The Red Cross Disaster Committee opened public buildings in the city to care for the people evacuated from an estimated 5,000 homes.

Sandbag Brigades

Civilian groups organized themselves into sandbag brigades and were able, with slight supervision from the civic authorities, to sandbag dikes ahead of rising waters and protect a considerable area of valuable residential property.

The Public Service Department forces concentrated their principal efforts on pulling debris from bridges as it came through on the high waters, with some special attention to levees which protected the high-value business district of the city from flooding. The Park Board employees concentrated their efforts on assisting in sandbagging the rivers and in temporary bank protection to prevent cutting of the river bank flowing down through a system of parks.

A large part of the credit for work done all through the disaster belongs to the civilian organizations which functioned perfectly with a minor amount of supervision from public officers.

The Big Arkansas River, the third stream flowing through the city, was not in flood at the time of the flood of the Little River and gave very little concern in the city excepting from drainage coming from the Little River which emptied into it near the central business district.

An estimate of demages was prepared which can only be an intelligent guess. The Red Cross Disaster Committee made a very excellent flood map of the Arkansas River, with pretty accurate counts of dwellings in the flood area. About 5,000 homes within the county suffered damage. Damage has been conservatively estimated at $200 per home; furnishings alone would total $1,000,000. Very severe individual losses in material stocks were reported by some industries.

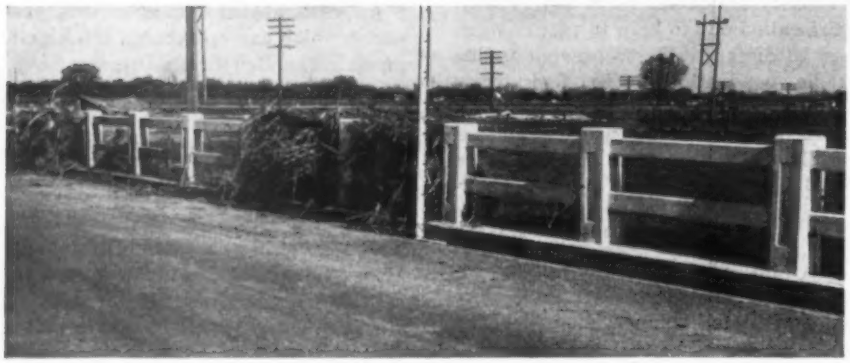
Pavement Damage

Roads and streets within the city were badly eroded all through the flooded area. One striking location is 22nd and Fairview (see photo), an area of unimproved streets except for some surface treatment with sanding, amounting to soil stabilization. Whirling currents at this corner excavated the street, to a depth of 20 ft., almost undermining several houses. Numerous such "craters" occurred.

The only real serious damage to pavement is illustrated in the picture showing pavement slabs dumped into an eroded hole. This came about

Here's a sad sight for a city engineer. Wichita, Kansas, as it appeared April 22, showing the drainage canal through the city and the overflow area. Looking south toward the center of town

(Left): Pavement undermined by creek crossflow and scour from an adjacent river. Pressure grout stabilization of the replaced sand fill is being considered. (Right): 22nd and Fairview, a typical unimproved street in which the current washed craters 20 ft. deep



Fast work was needed to keep drift from wrecking bridges

principally because of the fact that creek water overflowed across the residential section and back into the river at this point in considerable volume, scouring the river bank back to the pavement and then undermining it. The adjacent river itself overflowed in the opposite direction when in flood. This erosion is 6 or 8 ft. deep, with 150 ft. of pavement dumped into the hole. Arrangements are being made to backfill the hole with sand pumped from the river and restore the pavement. We are considering the stabilization of this sand by pressure grout methods to avoid a repetition of that particular disaster.

How Dam Is to Be Repaired

The city has a concrete dam in the Little River near its mouth. There is a shale bed about 25 ft. below normal low water which is overlaid with clean sand. The dam is supported on piling, with a core wall near the down-stream edge. Long continued pressure has breached a hole in the steel sheet piling so that the river, after the flood passed, is flowing under the dam. There is no structural damage, and there remains the problem of plugging this hole. We shall attempt to divert the water through sluice gates, build a sand silt coffer around the breached location and then fill the hole with tremied concrete. This will doubtless not be nearly as simple as it sounds.

Considerable damage was suffered by dikes and levees and river banks, which could be hazardous if another flood comes before restoration.

It will require many months, if not some years, to entirely remove flood scars along a river side park area, which has heretofore been well kept with neatly trimmed banks and rock walls.

▼

State Highway Department Notes

Wyoming is spending $370,000 on about 200 miles of road this summer under L-40-e, all by contract. Seal coat and chips will comprise the bulk of the work, with some strengthening and rehabilitation of oiled surfaces, according to state highway superintendent J. R. Bromley.

▼

Mississippi highway department plans to reseal 400 to 500 miles of asphaltic surfaces during 1944 at a cost of $500,000. A five-million dollar program of urgent grading, bridge and pavement construction work has been submitted to PRA, reports J. D. Monnette, acting chief engineer.

▼

Pennsylvania has authorized a $3,000,000 program of rural projects along roads where traffic is less than 100 vehicles per day. Some small bridges are also to be replaced this year, according to C. H. Buckius, chief engineer.

▼

In Missouri, according to chief engineer C. W. Brown, recent action by WPB will permit the highway department to ask for bids on about $1,500,000 in road repairs. In addition, application has been made to PRA for flood relief funds to cover five bridge replacements totaling about $400,000.

▼

New Hampshire highway department has three bridge projects suggested for 1944, provided materials, etc., are available.

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Oklahoma Submits Large Road Program

A $210,000,000 highway program for Oklahoma was outlined to the house committee in Washington recently by H. E. Bailey, new state highway engineer and Ben T. Childers, chairman of the State Highway Commission.

The state-wide program calls for 3,628 miles of high type paving to cost $97,160,000 and 1,560 miles of intermediate paving to cost $15,600,000. Grading and drainage of 6,190 miles of highways to cost approximately $37,140,000. The report also listed 1,268 bridges to cost $50,822,000 and 78 grade separations to cost $9,278,000.

Cutting and handling I-Beams for placement across top of old railroad Viaduct, to widen for 22-ft. roadway

Overseas Highway Now Completed

Notes on Cleary Brothers' $900,000 contract for widening 5 miles of old railroad viaduct, and other phases of road improvements to Key West

THE State Road Department of Florida, cooperating with the Federal Public Roads Administration, recently completed construction of the Overseas Highway by contract and with State Road Department construction forces as an access highway to the greatly expanded naval base in Key West.

The highway has been constructed on the roadbed of the Florida East Coast Railway, which was purchased by the State Road Department and The Overseas Road and Toll Bridge District after the 1935 Labor Day Hurricane which damaged the roadbed, rail and appurtenances to such an extent that the railway company abandoned all services below Florida City.

During 1936-1938 The Overseas Road and Toll Bridge District constructed two sections of highway over the railroad roadbed and converted several single-track bridge structures to a 20-ft. clear roadway section, thus eliminating the long ferry service then in existence from Lower Matecumbe to Grassy Key and from Key Vaca to NoName Key. These two sections totaled approximately 32 miles. In 1936 the State Road Department with its own forces constructed a two-mile causeway and three bridges between Upper and Lower Matecumbe Keys.

Cleary Brothers Contracts

The initial project let to contract was the Jewfish Greek Bridge. Cleary Brothers Construction Co., West Palm Beach, Fla., was the successful bidder on the work amounting to $198,-461. Work was started July, 1942, and the bridge formally opened May 16, this year. Progress was retarded through delays in securing allocations of critical materials, machinery and equipment. The structure is a double leaf bascule bridge on piers embedded in the solid rock underlying all of the Florida Keys. The contract included the placing of earth approach fills and automatic traffic barriers. The machinery is operated electrically with power supplied by a gasoline-driven generator located in the machinery room on the bridge. The following were the items included in the contract:

4.92 Acres Clearing and Grubbing, Removal of Existing Structures
13,477 cu. yd. Regular Excavation
495,763 Sta.-cu. yd. Overhaul
211.6 sq. yd. Cement Concrete Pavement, Reinforced (9 in. Thick)
4.73 MFBM Treated Structural Timber
768 Cu. yd. Concrete (Bascule Piers)
30.4 cu. yd. Concrete (Substructure, Pile Bents)
4.4 cu. yd. Concrete (Pile Jackets)
156 cu. yd. Concrete (Counterweights)
109.8 cu. yd. Concrete (Superstructure)
3.28 cu. yd. Concrete (Endwalls)
534 cu. yd. Concrete, Seal
263 lin. ft. Concrete Handrail
98,452 lb. Reinforcing Steel
248,840 lb. Structural Steel
45,000 lb. Machinery and Castings
128 lin. ft. Concrete Pipe Culvert (12")
1,600 lin. ft. Treated Timber Piling
31,000 lb. Steel Piling—Furnished (10" HP. at 42#)
700 lin. ft. Steel Piling—Driven (10" HP at 42#)
4 Inlets, Type "S" (0'-4' Deep)
94 lin. ft. Concrete Curb and Gutter
1,382 sq. yd. Waterproofing
2 Project Markers, Complete
3,220 sq. ft. Steel Bridge Floor
1 Control House
1 Engine Generator Unit
1 Traffic Barrier
Furnishing Electrical Equipment
Installing Electrical Equipment

Cleary Brothers Construction Co. was also the successful bidder for the conversion of the 17 existing concrete arch viaducts between Key West and Big Pine Key and the construction of a 35-ft. span concrete girder type bridge at Harris Gap, replacing an existing timber railroad trestle. The contract price for this work amounted to $882,742 for converting 21,675 lin. ft. of viaducts to a 22-ft. roadway section, and the above-mentioned span.

The conversion was accomplished by cutting beam seats in the viaduct spandrel walls 10 to 12 in. deep. Twelve and 14-in. "I" Beams, depending upon the amount of overhang, were then anchored to these seats. The portion of the beams between the outside faces of the spandrel walls were membrane waterproofed and the overhang was protected with Tnemec red and black

2300 RPM LATER

For many years, the excessive weight and bulk of cumbersome, slow speed models barred the door to low cost diesel power for many industries and countless types of equipment. But now—2300 RPM later—that barrier has been removed by the high speed diesel. In this trend toward higher horsepower output through higher engine speeds, the Cummins Dependable Diesel has consistently been the trail blazer—the leader. Every day sees this trend continuing . . . just as every day sees Cummins Diesel Power doing the toughest heavy-duty jobs at a lower cost . . . with greater profit.
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SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

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paint. The overhang slabs, which varied in width from 6 ft. 9 in. to 7 ft 8 in. from inside face of spandrel wall to outside line of curb, were then cast on each side. A reinforced concrete pavement slab was later placed between the overhang slab on the earth fill between the spandrel walls, providing an overall pavement width of 22 ft.

The Department designed a new type wheel guard and handrail for these structures using only one rail. The use of this rail has greatly enhanced the appearance of the bridges.

Work was started in August, 1942, and was completed on March 3, 1944. The following were the items included in the contract:

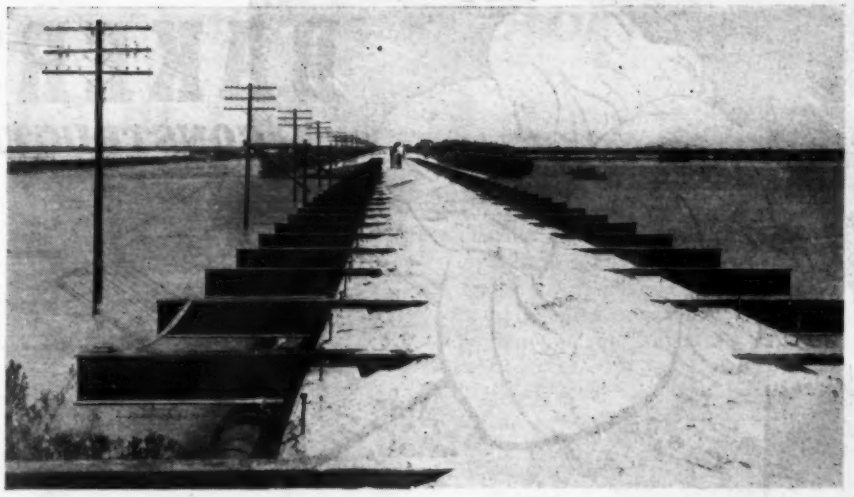
49.86 Acres Clearing and Grubbing
5,395 cu. yd. Regular Excavation
24,458.39 sq. yd. Cement Concrete Pavement, Reinforced (6 in. Thick)
12,072.0 cu. yd. Concrete (Superstructure and Approach Slabs)
43,417 lin. ft. Concrete Handrail
2,070,910 lb. Reinforcing Steel
2,127,335 lb. Structural Steel
25,707 sq. yd. Waterproofing
38 Project Markers, Complete
25,802 sq. yd. Membrane Waterproofing
1.6 MFBM Treated Structural Timber
25.8 cu. yd. Concrete (Substructure)
1,500 lin. ft. Treated Timber Piling
14.2 MFBM Timber Sheet Piling
11,366 sq. yd. Painting, Tnemec Paint
14,900 Steel Pile Furnished
400 Steel Pile Driven
1 Anchor

On April 12, 1943, Groves, Lundin and Cox, Minneapolis, Minn., was awarded contracts for the roadway construction of two sections totaling 42 miles. One section extended across Key Vaca and Grassy Key 11.685 miles in length. The work consisted of constructing a 22-ft. pavement with 7-ft. shoulders on the old railway alignment. Work was initiated in May and completed on February 28, 1944. The work included the following items:

90.70 Acres Clearing and Grubbing
81,608 cu. yd. Regular Excavation
170,412 cu. yd. Regular Excavation (Borrow & Base Material)
126,614 Sta.-cu. yd. Overhaul (Roadway Excavation & A-5 Material)
4,252 cu. yd. Cover Material for Type 2
91,843 gal. Bituminous Material (Surface Treatment)
2 Project Markers, Complete
95,980 sq. yd. Sprigging
153,072 sq. yd. Shaping and Compacting Base Material (8 in. Deep)
100 Removal of Existing Trestle

The second section extended from Lower Matecumbe to Key Largo totaling 30.315 miles. The typical of the roadway was the same design as explained above. Work was started in May, 1943, and it is expected all work will be completed during the 1944 summer. The items included in the contract are as follows:

197.38 Acres Clearing and Grubbing
42,753 cu. yd. Regular Excavation



Showing beams in place ready for placement of over hang slabs, to support concrete pavement

618,181 cu. yd. Regular Excavation (Borrow and Base Material)
11,115 cu. yd. Cover Material for Type 2
240,085 gal. Bituminous Material (Surface Treatment)
2,558 sq. yd. Stone Riprap
9 Project Markers, Complete
7 Project Markers, Plate Only
400,142 sq. yd. Shaping & Compacting Base Material (8 in. Deep)
124 Guard Rail Posts
400 Removal of Existing Trestle

State forces have completed three concrete girder type bridges on timber piles at Tavernier, Snake and Teatable Channels and except for minor details have completed the 42 miles of roadway of the same design as explained previously in two sections, one between Florida City and Key Largo and the other between Big Pine Key and Key West. The cost will be about $1,630,000. Upon completion of this work an entire new roadway will be provided between Florida City and Key West.

The cost of the roadway and bridges, exclusive of the construction performed by the Overseas Road and Toll Bridge District and the State Road Department in 1936, will amount to about $4,500,000.

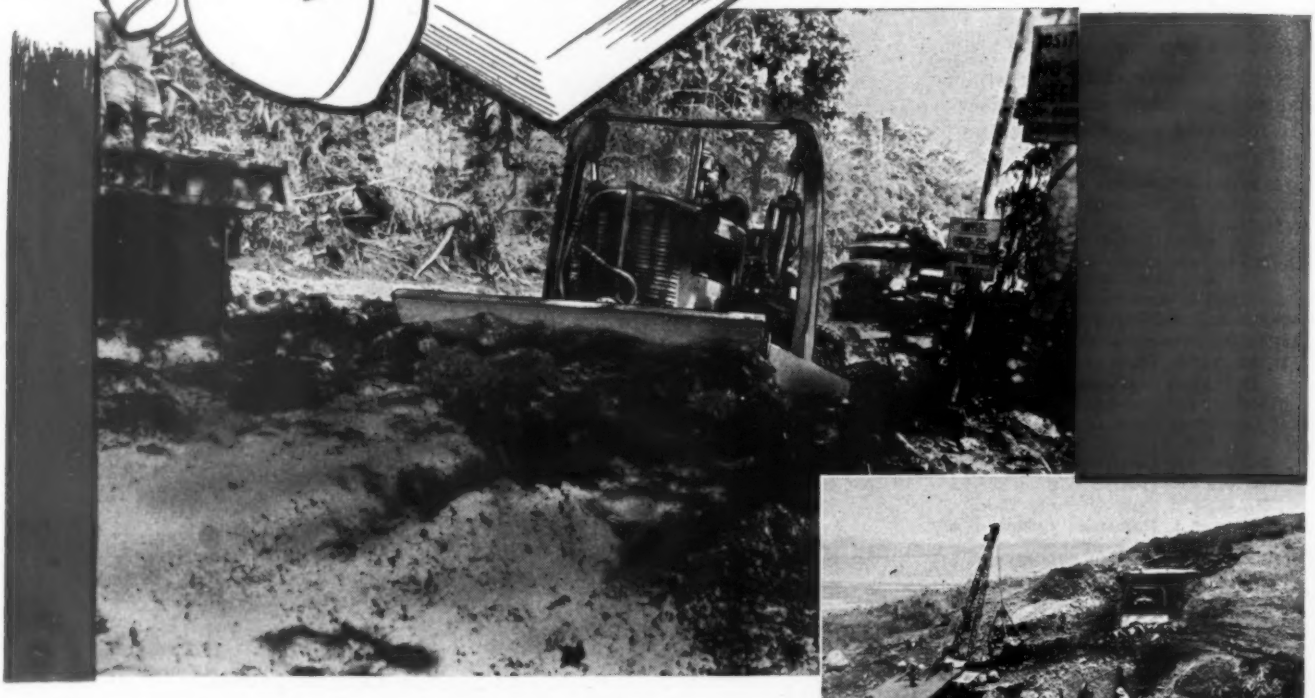
Engineering Training Program for War Veterans

Among the five specific training opportunities available to discharged veterans of this War under the training programs of the War Manpower Commission and the Federal Security Agency is an Engineering, Science and Management War Training program. This operates through more than 200 colleges and universities, and provides short, intensive courses, including engineering, chemistry, physics, and business management. It is administered by the U. S. Office of Education of the Federal Security Agency through selected colleges and universities.

▼

A glaring example of the effect of poor street and highway lighting on the night accident problem is reported by the Connecticut Motor Vehicle Department . . . 767 property damage accidents, 429 injuries, 23 fatalities, 262 pedestrian accidents, and 1,037 accidents of all types at night in excess of the number which probably would have occurred at the 1942 night accident rate.

BAKERS ON THE BIGGEST CONSTRUCTION JOB IN HISTORY —WORLD WAR II



Top: Baker bulldozer road in New Caledonia. Center: Blasting coral "dumps" Fiji Islands. Bottom: Dozing trees for air base: Australia. Bakers are on every front.

So you think Boulder Dam and the Panama Canal were big jobs? They were pikers compared to the construction job of them all—World War II. More earth is being moved, more trees dozed, more roads, bridges and buildings built and more buildings razed than on any other job at any time.

It's taking an endless amount of construction equipment of all kinds, including Baker Bulldozers and Gradebuilders by the hundreds.

This *Biggest Construction Job* calls for speed—that's where Bakers come in. Powerful hydraulic down-pressure on the blade bites deep into Italian lava, Algerian sand or South Pacific coral —gets full loads faster. Too, Bakers are as simple as they look—fewer parts—easier to maintain. No wonder the boys in the Seabees and the U. S. Engineers swear *by* them—not *at* them.

After monthly war quotas have been met, a few units are left for high priority requirements. If yours is a war job, you may be eligible. See your Baker, Allis-Chalmers dealer.

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506 Stanford Avenue **Springfield, Illinois**

BULLDOZERS SNOW PLOWS **BAKER** CONSTRUCTION EQUIPMENT

Problems American Contractors Face in Latin America

By J. L. HARRISON

Principal Highway Engineer, Inter-American Regional Office, Public Roads Administration, Federal Works Agency

WHEN a new field of operation is under consideration it is quite as important to ponder over its future possibilities as over its immediate prospects. This will, of course, include a consideration of the probable distribution of projects in that field, their size, their frequency of occurrence, etc.

It's a Long Distance Between Jobs

Taking the whole area of Central and South America as a prospective field a good deal of work is in prospect and over the next 10 or 20 years present indications are that the volume of work offered will tend to increase. But this is a large area—a very large area as a matter of fact—and there is little chance of keeping in touch with all of it. There will be a big project here this year and perhaps another 1,000 miles away next year. The means of keeping in touch with prospective work are not organized as they have been by the technical press in this country and, in general, are not international in scope. For this reason the contractor who enters the Latin American field will find that it is a good deal of a problem to maintain a steady volume of business because projects are so scattered, and the problem of keeping track of those which are pending is so great.

This condition has another aspect which deserves comment. We are accustomed to think of the fact of being on the ground as one of a good deal of importance. The cost of bringing equipment to a job and getting it set up and ready to operate is considerable. From this we usually assume that the closer a contractor is to a prospective job, the better his prospect is of getting it. But this is not at all certain to apply in the large areas to the south of us for there the distance between jobs is apt to be considerable and transportation conditions such that the man nearest to the job, in miles, may be farthest away, transportation facilities considered. In fact, it is literally true that a contractor in London or even one in New York would be nearer, from the transportation standpoint, to many places in South America than a contractor located in Rio de Janeiro or Buenos Aires would be. This, of course, applies more to large contractors equipped to handle large undertakings than to small contractors, but, in any event, small contractors will hardly wish to adventure in this field for it is by no means unoccupied. As in other parts of the world there are numerous local contractors who are in a position to compete for small projects and for projects of moderate size.

Local Competition Will Be Tough

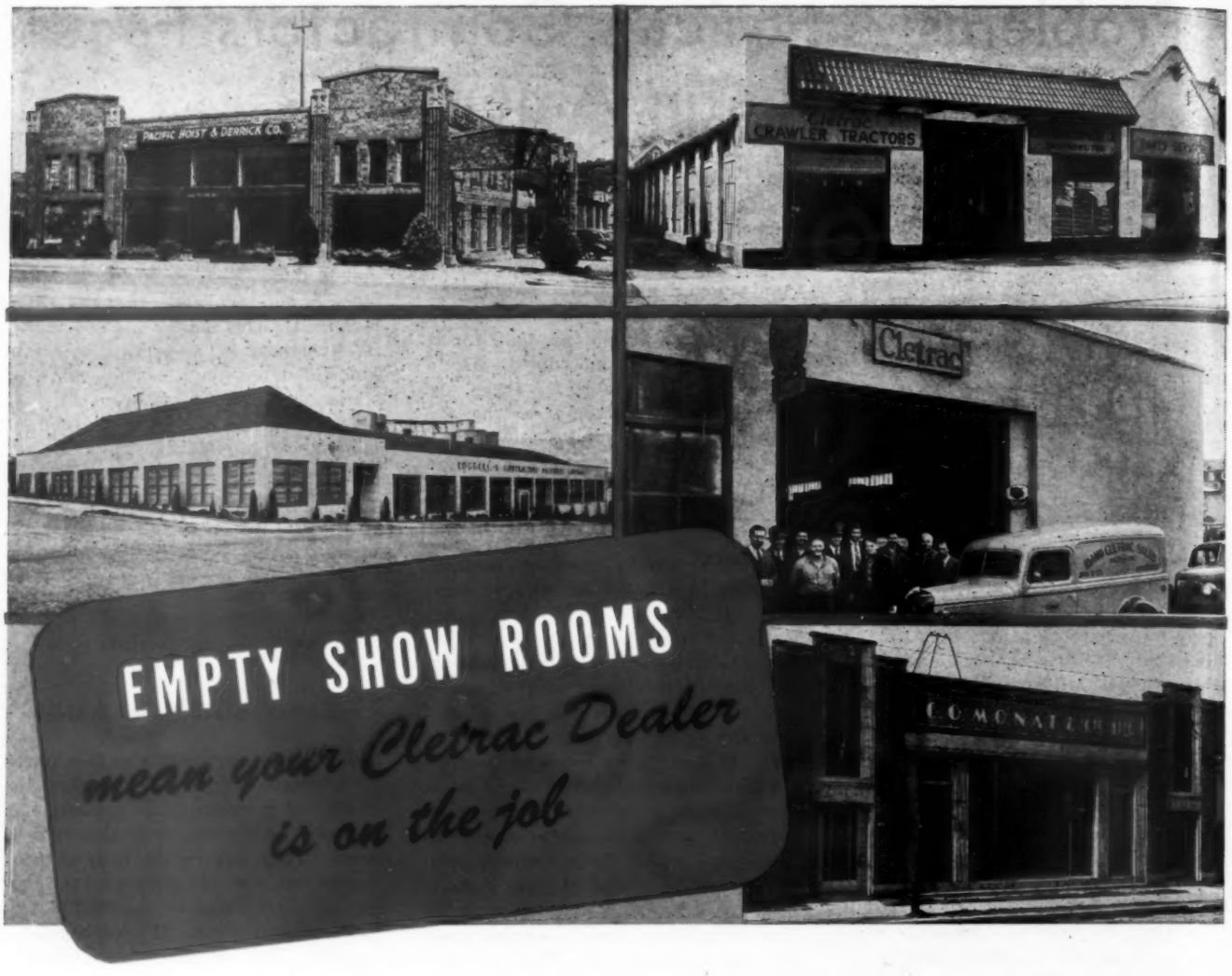
When a North American contractor goes into Latin America to compete with local contractors, he is normally led to do so by his assumption that his larger experience in managing construction work and his superior equipment will give him a considerable advantage over the local man. If local laws make it possible for him to compete at all—and in at least some of these countries the small contractor would encounter almost as much opposition as a Chinese contractor would encounter if he endeavored to invade this country with his men and his methods, and for about the same reasons—he will find that his difficulties have just begun. The large contractor does not, as a rule, encounter as many difficulties largely, of course, because there is limited local competition in the large projects field. But, whether he is a small contractor or a large contractor, if he has never worked in this field before he is likely, very shortly, to find that his assumption of advantage is not as well founded as it seemed to be. Many contractors working in the United States have found to their sorrow that the relatively simple matter of moving into another state has proved both discouraging and costly. New conditions which did not, from the distance, seem so different, different specifications, a slightly different class of labor—these and other differences—had so upset calculations that losses had to be taken where profits had been expected.

Going into a new country develops all of these differences—only in much greater degree—and others too numerous to mention here. That assumption of superior experience in management was based on handling men accustomed to that type of management. It was not based on handling the wholly different types of labor available in Latin America. Of the characteristics of these types of labor American contractors know nothing—and it takes years to learn. Management is not separable from the thing managed. The manager's expertness is expertness in managing a certain kind of labor on a certain kind of work. Give him a different kind of work or a wholly different kind of labor and his expertness, at least for a time, is lost. It follows that the North American contractor who tries to "set up shop" in Latin America finds that he is no expert at all because he has had no experience with the labor available there. In time he may gain this experience but, until he does—well, he certainly is no expert!

Equipment Maintenance Problems

Handling equipment also is a phase of management. In this country the design of a construction organization is based on the machines that will be used. They govern the hour to hour production with job personnel in number and qualifications selected to validate whatever rate of production the machines are capable of turning out. The basic idea is an arrangement of machines and of men that is capable of maintaining smooth, steady production at some predetermined rate. In an organization of this sort, if a single unit breaks down the whole organization may be tied up. At best, the break-down of even a single machine in a carefully designed setup is certain to interfere with production.

There is nothing new about this relationship of equipment to production. It applies on any work which is based on the use of modern equipment. But—and here lies the difference—while the contractor here finds that equipment break-downs are bothersome, interfere with production, disrupt his organization, etc., he can usually avoid serious trouble from this cause because, normally, he can get a part to replace that broken part, within 24 hours. Abroad he is fortunate to be able to get it within 24 days, and it is more likely to take two or three times that. It may easily take a good deal longer. Equipment that had always seemed to him quite reasonably dependable becomes a nightmare when parts can't be had under two months and, when they arrive, are found not



THE show room of your Cletrac distributor is probably empty of new machines. This merely means he is right on the job today in his service department — busier and doing more work than he once thought possible.

Plagued with shortages of men and material, loaded with more demands for service than ever before, he is still doing the impossible, day after day, in helping to keep present tractor equipment in working condition.

In these efforts he is not only making a full contribution to the war by saving time and money for Cletrac owners, but also helping to conserve equipment needed to carry on the jobs of the home front. The big task today is to keep your present equipment running.

There is a limited number of new Cletracs available. These tractors are not in your dealer's showroom but subject to government release. Your Cletrac dealer will gladly assist you in making application for a new Cletrac if you can qualify as an essential user.

CLETRAC REPORTS ON ITS WAR EFFORT

This folder, recently published, tells briefly of Cletrac's part in the war effort. A copy will be mailed on request.

THE CLEVELAND TRACTOR COMPANY • CLEVELAND 17, OHIO

to be the ones needed! This happens in spite of the best of effort all along the line!

And the organization so accurately designed? Does it function as planned? It does not. It is the shovel that's down today. With luck, it is back at work in a month. Then a couple of trucks have to be laid up. Then some of the tractors give trouble. Even the pans—simple units though they are—develop a weird indisposition toward steady performance. If it is nothing else their cables wear out at an unexpected rate. And the planned production? Well, the less said about that the better. When the equipment goes sour, the more accurately the organization has been designed the more completely its performance is destroyed!

An ox-cart can be kept moving even though the owner hasn't greased it in months, the wheels wobble and the body is ready to fall apart. But a modern watch stops if a flick of dust gets into the works. Old fashioned construction organizations were like the ox-cart. They might creak a lot and wobble—and the competition an American contractor will meet abroad is apt to be of this order—but his organization, based on the use of modern equipment, is much more like the watch. It won't run at all if the key units are down—and there's the rub! Keeping them running thousands of miles from the sources from which spare parts can be obtained is a problem the like of which the contractor when first confronted by it is pretty certain to decide he has never encountered before.

The Skill and Labor Problem

And, then there is the problem of operators. In this country, in normal times, a contractor can obtain any number of operators by simply giving notice that he has work on which they may obtain employment. Not all will prove satisfactory, but the supply generally exceeds the demand, so replacements can easily be had if first selections prove not wholly satisfactory.

Abroad there are so few operators that they may almost be said to be non-existent. In many large areas there literally are no operators to be had. If modern equipment is to be used the contractor must, then, either import American operators or train local operators. Importing American operators is expensive and the rates of wages which must be paid are so high that they very adversely affect the competitive advantage the possession of modern equipment is expected to provide. If the alternate—training local nationals as equipment operators—is accepted, it soon develops that this is a slow process. Ultimately the best of such operators will prove as good as most American operators but it takes a good many months to train them, and in the meantime serious damage is likely to have been done to a good deal of the equipment. As a matter of course, production will have been less than was expected.

Plans Are Less Detailed—Inspection Less Responsible

Then there is the matter of plans. American contractors have become accustomed to plans which are prepared in great detail, and to having their work laid out for them and inspected by men who are professionally competent, if, at times, a bit exacting. Abroad, plans are apt to be sketchy. Often they are so sketchy that the contractor must amplify them at considerable expense before he can obtain anything which approaches an exact idea of the amount of work to be done. Not infrequently he must make the plans as well as do the work. Inevitably he must expect to lay out the work.

Inspection may not be in the hands of professionally trained men. In many places the owner is represented on the job by a man known as an "interventor" who has somewhat the same responsibility here associated with the term inspector. He may be an engineer but it is equally possible that he will be a local politician or even a farmer or a blacksmith or a barber. Usually his intentions are good but, knowing little or nothing of the technical aspects of construction, his demands can create surprising situations and, as a matter of fact, often do! Those who have had to deal with inspection in this country, where inspection usually is in the hands of men who have both technical training and experience, will have a keen appreciation of the extent to which their problems can be increased by non-technical inspection.

Some Problems of Collection

And, then there is the matter of collections. Even in this country the arrangements which have been made for financing a project and the authority of those sponsoring it to act are matters every contractor appreciates require careful examination before a contract is signed. Even then contractors occasionally find to their sorrow that they have not been careful enough. Abroad, the laws and the customs followed in their interpretation are different. Financial arrangements often are not as complete as could be desired. Not infrequently they contemplate payment in bonds which, in turn, may have a somewhat indeterminate market value. Obviously these difficulties are not insurmountable but they do have an effect on the risk a contractor assumes in entering this field—a risk that it takes some years of active effort in it to reduce to a reasonable minimum. Also it generates a considerable expense for legal advice, for abroad, as in this country, reliable legal advice is expensive and no other kind is worth having.

The Price and the Reward of Experience

It will be appreciated that these comments are made for consideration by contractors who are contemplating work which, if taken, would be their first adventure in the foreign field. Those who manage to stay abroad beyond the life of their first few jobs gradually become familiar with local laws and their application to construction work. They also become familiar with the labor that is available, and learn where it is profitable to use modern equipment and under what conditions the older methods of handling work are preferable. They also, in time, develop good operators just as they have in days gone by, develop them here in this country, come to manage their business affairs to harmonize with local conditions and design their organizations to include methods of operation which have had local acceptance as well as those which are based on the use of modern equipment. In this way a type of organization is developed which makes the best use of local methods and of imported machines it is possible to make in the region in which the organization is to operate. But it takes years of experience before this sort of versatility in the design of construction organizations to meet local conditions is developed. The contractor going abroad for the first time must base his plans on conditions as he understands them and a style of organization with which he is familiar. The point is that this seldom fits conditions as they are.

Of course any American contractor who maintains himself abroad for any considerable period becomes familiar with the local laws and local customs which affect his operations. But to any contractor who has never operated outside of this country the laws which affect his operations will be found to involve many things that are quite new to him. As would be equally true here, the outside contractor is likely to make many mistakes before he masters the intent of these laws and the way in which they are customarily understood and enforced.

69,000 Miles without a Part Replacement

That is the report of the driver of this Marmon-Herrington *All-Wheel-Drive* converted Ford truck on the Pioneer trail of the Alcan Highway.

Badly overloaded with contractors' supplies, and travelling over all kinds of roads and trails, in all kinds of weather, the truck was a never-ending surprise, in its performance. The regular run had one stretch "with a continuous climb over a distance of better than six miles, with grades up to about twenty percent."

It was this driver's first experience with a Marmon-Herrington *All-Wheel-Drive*. No wonder he was surprised, for the ability of a Marmon-Herrington, to conquer the worst possible going, is a revelation. It goes places and does things entirely beyond the ability of any "ordinary" truck, as has been proved by hundreds of drivers in the most difficult civilian and military services.

Investigate the advantages of Marmon-Herrington *All-Wheel-Drives*, now. Be ready to get your order in early, when Peace comes.

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All-Wheel-Drive TRUCKS

MARMON-HERRINGTON CO., Inc., INDIANAPOLIS 7, INDIANA

Dozer and shovel teamed up for loading coral on a new base in the South Pacific

Army Engineers in the South Seas

The Army engineers and their American equipment are a long way from home here, too. They're building road from a big borrow pit in the Cape Sudest area, New Guinea

THE wide diversity of tasks required of the U. S. Army engineers in the South Seas was outlined in January, 1944, ROADS AND STREETS by Major General Eugene Reybold, Chief of Engineers.

The accompanying photos released by the Chief of Engineers to ROADS AND STREETS glimpses a few of these tasks. They emphasize that earth moving is earth moving the world over, the only difference being color of the setting, or the nature of the material. And the same goes for materials handling. Thousands of pieces of American-made machinery have moved millions of tons of earth, stone, jungle debris, coral, and beach sand to carve roads and runways.

Modern material dryer being used by our U. S. Army engineers to speed road building in Northern Australia

With pile-driver-equipped crane, it doesn't take long to build a tank-unloading pier. Aviation engineers in New Guinea

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Alaska Highway Flight Strips

EIGHT flight strips, or auxiliary airports, located at strategic points in the wilderness of Northwest Canada and Alaska, are now in active operation along the 2,000-mile vital air-way between Edmonton, Alberta, and Fairbanks, Alaska, it is announced by the Northwest Service Command, U. S. Army. They were completed by contractors working for the NSC in less than six months at a cost of $2,363,000. Fewer than 500 civilian workers were employed.

The strips are serving a purpose said to have resulted already in a saving of property—to say nothing of human life—worth many times the cost of their construction.

The flight strips are spaced along the Alaska Highway because in many cases planes do "contact flying" (in direct contact with the ground), using the highway as a guide. In other cases planes also use this method of guidance in flying when their instruments have failed to function properly or when bad storms have forced them off the beams. The Northwest Staging Route, which these strips complement, is under the jurisdiction and operation of the Royal Canadian Air Force.

Procedure Reminiscent of Alcan

Construction presented problems similar to those faced by the pioneer builders of the Alaska Highway and the Canol Project.

Preliminary aerial reconnaisance for location was accomplished by Lt. Col. H. P. Little of the USAAF, and H. J. Corey, of Metcalfe-Hamilton-Kansas City Bridge Companies firm which had the construction contract. The surveyors spent several weeks in the spring of 1943 making reconnaisance before locating the strips, in order to find the most protected places from the adverse types of weather which can and do occur so swiftly over this route.

Actual site surveys to determine soil conditions and general construction difficulties supplemented this activity. After all sites had been approved, survey parties were sent out to the locations and engineering surveys then were made. From these, the final plans were prepared.

Some idea of the size of the task can be gained from the following overall statistics on the eight strips:

Clearing & Grubbing (acres)	648
General Excavation (cu. yd.)	937,000
Selected Borrow 12 in. (cu. yd.)	305,000
Surface Course 8 in. (cu. yd.)	159,000
Shelter Bldgs.	8
Wind Cones	8
*Equipment, heavy (av. 16 per strip)	126
**Equipment, light (av. 24 per strip)	188
Net construction cost at site (av. $295,000 per strip)	$2,363,000
Personnel average (av. 57 per strip)	453
Time Weeks (av. 9 per strip)	71

Construction of strips Nos. 1 to 4, inclusive, commenced June 25, 1943. Work on fields 5, 6, 7 and 8, got under way on July 20. All strips were completed and in full operation on or before Dec. 15, 1943.

While the actual conditions under which workers pushed through this little-known project were climatically favorable in comparison with the severe and variable elements in which most of the Alaska Highway and Canol Project construction was undertaken, the problems of terrain were in many instances identical. The same swamp-like muskeg was encountered; sand and gravel had to be hauled many miles to the actual point of use, and the problem of site clearing was considerable.

Where the road-builders had to clear a right-of-way of 60 to 100 ft. in width, strips required 500 ft. Runways were built to a minimum 6,000-ft. length.

*Rollers; scrapers; bulldozers.
**Trucks; blade graders; light bulldozers.

Route of "Bush" Flyers

Northwest Staging Route and its auxiliary flight strips has its origin in the old days of "bush flying" in, the Northwest. It is a tribute to the skill of these early pilots that the mortality of men and equipment was low. Directional beams were nonexistent; radio communication with the ground was undeveloped and the intrepidity of the fliers themselves often carried them home on what is still known as the "seats of their pants".

When, in the mid-1930's, the larger airlines of Canada and the U. S. began to survey the possibilities of airline routes to Alaska, they gained invaluable knowledge from the experiences of these courageous bush pilots.

In 1939, two airports went into operation at Fort St. John, B. C., and Grande Prairie, Alberta. Regular airmail and passenger service through Canada's far northwest and Alaska became an accomplished fact a few years later.

As early as 1926, there had been a landing field at Whitehorse and by the early 30's at Watson Lake, Fort Nelson and Fort St. John. This route was used by the old Yukon & Southern Rys., later absorbed by the Canadian Pacific Rys.

The Pan-American Airways air coastal route from Seattle, Wash., to Juneau and other Alaskan coastal

Flight strips along Alcan are playing an important role in U. S. Army activities today

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GOOD IDEA . . . FROM AWAY BACK . . .

It isn't hard to build a truck. But it's mighty hard to build a truck to match a Mack! And there's a reason. Back in 1900, John Mack set out to build the best truck in the world. His very first Mack stayed in service 17 years. Today we go forward with his same idea—backed by all we learned along the way. Big or little—heavy or light—no matter what type of Mack you own, you can be sure you'll get your money's worth in *work.* That's what "Built like a Mack truck" means. And the record says it means it *more* with every passing year.

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points sometimes is impossible of navigation, due to violent wind and snow storms, heavy, low-lying fogs and generally inclement weather. PAA in emergencies uses this system of airports ranging from Fort St. John to Whitehorse, Yukon Terr.

Today, less than five years after these airports went into active operation, Pan-American's flights from Seattle to interior Alaska fly often via the Fort Nelson-Watson Lake-Whitehorse route, although generally these flights are routed west of the Rockies via Prince George, Telegraph Creek, alternately Juneau, and Whitehorse.

Evidence that the newly operating flight strips were to become, as they have, a vital part of air operations in the north is found in the fact that even while construction of the fields was under way in the summer and early fall of 1943, planes landed on them, some for repairs, some because they had run out of gas and others because they were lost.

Some Construction Details

Strip No. 1 is about 350 miles northwest of Edmonton. Clearing and grading for this strip was done by the Public Roads Administration, and the work of Metcalfe, Hamilton & Kansas City Bridge Companies consisted only of consolidating and levelling the sub-grade as placed by the P.R.A. and building the necessary drainage structures. Sub-grade consisted of 18 in. of compacted pit-run gravel. The surface course consisted of 6 in. of stabilized gravel compacted by sheepsfoot, pneumatic and flat rollers. This course was brought to the proper grade with blade graders, and a bituminous seal coat applied. Data on this strip are as follows:

Clearing and Grubbing	2 acres
General Excavation	82,000 cu. yd.
Selected Borrow 12 in.....	53,000 cu. yd.
Surface Course 8 in.	27,000 cu. yd.
Shelter Building	1
Wind Cone	1
Personnel Average	65
Time Weeks	10
Equipment, heavy	22
Equipment, light	40
Net construction cost at site	$275,000

Strip No. 2 is located in a broad valley north of Fort St. John. To build it here required removal of from 1 to 5 ft. of muskeg and timber growth, using bulldozers and scrapers. The muskeg was replaced with a clay and gravel sub-base compacted by sheepsfoot and pneumatic rollers.

Base course consisted of 12 in. of quarried sandstone, hauled three miles. A 3-in. wearing course consisted of 1½ in. crushed sandstone, distributed, compacted and shaped by the use of trucks, flat rollers and blade graders.

Strip No. 3 is located toward Fort Nelson, B. C., on a high plateau. From a construction standpoint, this location was ideal, the strip being on natural gravel. Clearing and grubbing and the removal of trees and brush was very light. Some undesirable silt pockets were replaced with gravel, with power shovels, scoops and trucks.

Strip No. 4, northwest of Fort Nelson, lies in a fairly low level area, near the Liard River. Considerable difficulty was encountered in clearing heavy-jack-pine and spruce timber, which required hand felling. Fallen trees were dozed into windrows and burnt or dozed into the river.

A considerable portion of the site consisted of fine sand, on which was placed a 12-in. sub-base course of pit run sand and gravel, compacted, a 5-in. stabilized base and 3-in. surface of crushed gravel.

Strip No. 5, located east of Whitehorse, also was heavily wooded. The natural ground was a gravel bed and the entire area was covered with large boulders, ranging from several hundred pounds to fifty pounds each. Several feet of this material was removed with dozers, power shovels and tracks, before grading up on the coarse gravel beneath.

Strip No. 6 is also east of Whitehorse.

Strip No. 7, west of Whitehorse, is located on a ridge.

Strip No. 8 is farther west of Whitehorse. Clearing and removal of trees and brush was comparatively simple. The natural ground was a sand gravel deposit—very suitable for sub-base—and, after the proper grading and blading, received 4 in. of selected pit-run gravel for a base, on which was placed two 4-in. lifts of ¾ in. maximum material for surface course.

Equipment Makers Tackle Problems of War Surpluses

To aid in solving problems attendant with the disposition of surplus war construction equipment, the Manufacturers' Division of the American Road Builders' Association met in Washington, D. C., last month, to begin the work of formulating recommendations as requested by the Surplus War Property Administration.

Over 100 people attended the meeting which was addressed by high government officials charged with handling the disposal of surplus properties. E. R. Galvin, division president, presided.

Keynoter was Charles M. Upham, Engineer-Director of the Association, who said that a postwar highway program can be completely disrupted by an illogical or poorly-planned distribution of surplus war equipment and materials; that the problem did not belong to any one segment of the highway industry, but concerned all interested in obtaining a healthy postwar economy.

W. L. Clayton, Administrator, Surplus War Property Administration, declared that the government's interest in returns from the sale of surplus property was secondary to the establishment of a sound economy; that SWPA would not give anything away unless Congress stipulated otherwise. Although many policies have not yet been formulated by SWPA, Mr. Clayton said that first preference on the sale of surpluses would be given Federal agencies. Next in line would be non-Federal tax-supported agencies of which there are some 200,000. Reasonable, fair and uniform prices would be asked for all surplus commodities. He emphasized the necessity of utilizing established channels of trade in marketing surpluses.

In regard to equipment in foreign countries, Mr. Clayton said that whether it would be returned would depend upon the facts of each case; that generally equipment abroad would doubtless remain abroad. He pointed out that the United Nations Rehabilitation and Relief Administration would be a large purchaser of surplus equipment left abroad after the war, and that probably it would buy much equipment in this country for use in foreign countries.

Major General Philip B. Fleming, FWA Administrator, said that as a member of the Advisory Board of SWPA, he would appreciate recommendations of the highway industry and profession. General Fleming placed emphasis on the economic problems presented upon the war's conclusion, and the need for having a huge backlog of construction plans ready.

Construction equipment will be handled by the U. S. Treasury Department through Ernest L. Olrich, recently appointed Assistant to the Secretary of the Treasury. The Procurement Division of the Treasury Department will be utilized in carrying on the disposal work. In his talk, C. E. Mack, Director of the Procurement Division, paid tribute to the ARBA's helpful assistance. He said that insofar as possible disposal work would be decentralized and handled through the eleven field offices of the Procurement Division.

MODEL
LD-2

The HEIL Cable Power Control Unit

is designed for long-life, low-cost service

- ★ *Gears of forged alloy steel*
- ★ *Gear Case of welded steel*
- ★ *Clutches fitted with moulded linings*
- ★ *Fully automatic brake action*
- ★ *Control Levers easily adjustable to operator's reach.*

Available separately for cable-scraper operation with all makes of tractors

Many features have been provided in Heil Cable Power Control Units to assure increased output and reduced operating expense. The smooth-operating brake and clutch assemblies eliminate shocks and jerks; the large drums run cool; the sheaves are designed to reduce wear on the cables. This adds up to minimum outlay for cable replacement. Fingertip control gives you lightning-fast action with little effort. For sustained high production and lower operating costs, equip your tractors with famous Heil Power Control Units.

R-29

Send for descriptive bulletins.

ARMY E NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

It was decided that the Board of Directors of the Manufacturers' Division would constitute the nucleus of a special construction Machinery Mfrs. War Surplus Committee to study disposal problems and to make recommendations to SWPA. E. R. Galvin, Division President, will serve as chairman. Mr. Galvin also invited other manufacturers who face important disposal problems to become members. Committeemen announced are: E. R. Galvin (LeTourneau), John L. Connors (Galion), W. B. Greene (Barber-Greene), Howard Hall (Iowa Manufacturing), B. C. Heacock (Caterpillar), Paul B. Cochran (Buckeye), T. M. Deal (Link-Belt, Speeder), C. D. Macpherson (Gar Wood), John L. McCaffrey (Int. Harvester), W. A. Roberts (Allis-Chalmers), Chauncy B. Smythe (Thew), L. E. Dauer (Trackson), B. F. Devine (Chain Belt), G. J. Dimond (Koehring), Robert T. Harris (Blaw Knox), Henry N. Schramm (Schramm), R. K. Stiles (Austin-Western), W. McK. White (White Manufacturing), J. E. Gaylord (Jaeger), F. Salditt (Harnischfeger), and D. D. Kennedy (Foote). Mr. Upham will serve as executive secretary.

▼

Uniform Contract Termination Forms Issued

The War Department on May 17 issued its first standard termination forms for contract settlements. The forms are published in three main divisions. The first, settlement for large claims, consists of the contractor's proposal for settlement and separate supporting schedules for listing termination costs and inventories. The second is a combination short form for claims amounting to no more than $10,000. Here the contractor's proposal, costs and inventories may be listed on one form. For very small claims which come under $500 in value, a third and still shorter form is issued upon which the contractor can simply state his proposal for settlement.

The new uniform termination forms are available to contractors through the Army procurement offices in different parts of the country.

On the same day the new forms were published, the War Department announced a new publication arrangement for its official regulations governing procedures and policies of contract termination. This document, which is the bible of both contractors and Government personnel in bringing about settlements of war contracts, is known as Procurement Regulation No. 15. By application to the Super-

intendent of Documents, Government Printing Office, Washington, D. C., War Department contractors may now obtain the latest issue of PR-15 for $1, which includes the next twelve amendments.

A.G.C. Tackles Public Relations, Labor, Postwar Problems

At its spring meeting of governing and advisory boards in Chicago, May 29-30, the Associated General Contractors of America, Inc., launched plans for gaining public recognition of the essential place of the construction contractor in a modern world. Lyle Johnson of the advertising agency, Campbell-Ewald Company, recently retained as counsel by the Association, outlined a proposed program that would take the place of the uncontrolled publicity the industry has received heretofore. Aiming at correcting the undesirable publicity and misunderstanding of the contractor by the man on the street, a public relations manual is to be prepared for Association members, chapters and branches.

The A.G.C. meeting also devoted time to labor problems, which have been made more troublesome due to confusion existing between various laws and rulings of labor agencies; inability to hold valuable employes because of salary freeze; general labor shortage and other reasons. A labor relations manual was distributed which included a summary of Association labor policies, recommendations on wage stabilization, and notes on the recent Wage Adjustment Board interpretation of Secretary of Labor Order 9240 on construction overtime pay schedules under O.P.M.

On the outlook for future construction work, Managing Director H. E. Foreman reported that 1944 construction volume will probably total about $3,500,000,000, smallest since 1932. The A.G.C. is trying to make available for contractors certain logging, mining and oil-field work, for which contractors would otherwise be asked to turn their equipment over to others to perform.

Market Development Committee chairman Fred Rowe, on the post-war market, reported that there is a serious lag in the utilization of the $60,000,000 in state highway planning funds available for pushing post-war construction plans and surveys. Only one-third is applied to date; only $13,000,000 has been used for plans actually ready. Plans are ready for about a billion dollars in non-federal public post-war projects of all kinds. He urged immediate revision of tax laws to encourage plans for private post-war construction investment.

HEIL BULLDOZERS

(tailor-made to Cletrac Tractors)

have the rugged strength ... perfect balance ... full visibility that enables you to move more

PAY DIRT

every hour ... every day at substantial savings

A Bottom-Dump Trailer Wagon that is breaking all the SPEED records.

High-clearance doors that operate on the clamshell principle, enable your operator to dump and get away in a flash. The doors are *power-opened* — in 2 seconds — under cable control (they *close* by gravity). No doors dragging in the dirt — nothing to slow up the unit. The operator turns off the windrow at sharp angles whenever he chooses — dumping is under fingertip control — all in one heap, or with an even spread that looks almost like the work of a cable scraper. Get a post-war "priority" by ordering now!

Write for bulletins

Sound engineering design, reduced to the utmost simplicity, guarantees few service interruptions and cuts maintenance costs.

Note the operator's unobstructed view and the convenience of the controls that enable him to work accurately with no loss of speed. See how Heil engineers have pioneered the modern practice of replacing heavy cast members with welded box sections that are lighter, stronger, and easy to repair in the field without costly delays.

For full loads and more yardage — at lower cost—use Heil Earth-moving equipment. *Write for bulletins.* R-30

See Your Cletrac Tractor Distributor

ARMY NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

★ ★ With Road Builders in Uniform ★ ★

From the South Pacific to England and from the Aleutians to Burma you'll find them serving today . . . the thousands of road builders who've gone out from contracting firms, state highway departments, and county, city and federal engineering posts. Here is news of a few of them. More next month. Send us your items!

Three More West Virginia Men in Service

Former West Virginia state highway department men now in uniform:

Lt. John B. Bolyard, formerly assistant maintenance supervisor in Preston county, is a P-38 pilot with General Chenault's Flying Tigers in China.

Lt. John B. Bolyard

Lt. E. W. Ripley, Jr.

Lt. E. W. Ripley, Jr., former district engineer, is Commanding Officer of Headquarters Company, 31st Special Construction Battalion, Rhode Island.

Lt. Millard Thrash, for several years maintenance clerk in Roane county, is now a U.S.N.R. fighter pilot. He has been on active duty in the South Pacific where his carrier the "Wasp" was torpedoed; made two trips to Malta; saw action at Guadalcanal (where he brought down a Jap bomber), and was in a formation of eight Grumman Wildcats which attacked the Jap airbase at Munda in June, 1943, bringing down another bomber, but his Wildcat, old "Roane County" (W. Va.) was blasted by Zeros and he crash-landed. Lt. Thrash is now stationed at Sanford, Fla., as A.O.T.C. Combat Supervisor.

Lt. Millard Thrash

New Jersey Highway Engineers in Aleutians

Recognition recently was given several former New Jersey highway engineers by the **Philadelphia Evening Bulletin** in articles on construction at Adak Island in the Aleutians.

While they were still living in pup tents on mucky grounds and sloshing through knee-deep mud, Morley Cassidy, staff writer, reported how they organized their work. At night their beds sank through the mud to the depth of the bed springs, **Lt. Charles J. McGinnis,** former N. J. highway maintenance inspector, took over truck and heavy equipment operation to get through the muck.

Lt. George A. Kraus, former project engineer, staked out the road network, and **Capt. Carl J. Teegen,** construction division engineer, led road construction. **Capt. Frank W. Higgins,** prominent resident engineer from South Jersey, and **Capt. Thomas H. LaBar,** widely known senior engineer, carried on the important work of airport construction.

Warrant Officer W. J. Durnford

William J. Durnford, formerly a contractor in Bloomington, Wisc., is a Warrant Officer in the Seabees, now in the New Hebredies Islands. He is a World War I veteran. His address is C.E.C. (V.) S.U.S.N.R., C.B.D.-1029, C/O Fleet Postoffice, San Francisco.

Major N. W. Hyland, formerly asst. director of public works of Kansas City, Mo., and later with the Sunflower Ordinance Plant, De Soto, Kansas, is in the Italian theatre.

Major N. W. Hyland

Capt. F. Gunner Gramatky

Captain F. Gunner Gramatky has been in the U. S. Engineer Corps for almost two years, and is now serving as Operations Officer with the 27th Engineer Combat Battalion, in the New Guinea area. He was formerly with the Gunner Corp., Pasadena, Calif.

Three Calif. Contractors in Service

Lt. Ben C. Gerwick, Jr.

Here are the pictures of 3 California contractors in uniform who were listed in the May issue of R&S, formerly employed by Ben C. Gerwick, Inc., contractors, San Francisco. Another former employee of this company, now in the service, is Lt. Jack Weiss, U.S.N.R.

2nd Lt. Alan Fraser

Lt. Comdr. J. C. Bronson

Clement F. Sculley, Jr., first vice-president, Clement F. Sculley Equipment Co., general contractors, St. Paul, Minn., at last reports was located at Mills Field, San Francisco, Calif. He enlisted as an aviator, but, being a civil engineer, was assigned to Rantoul Field, Ill., for a 4-months' course in aeronautical engineering. On graduation he was sent to Hamilton Field, Calif., and later to Mills Field.

C. F. Sculley, Jr.

He is now a captain in the Air Forces, stationed at Mills Field, Calif. An interesting sidelight on his western assignment is that on graduation from Rantoul Field, Illinois, he was given a choice of going east or west. He said he would rather shoot Japs than Germans and was sent to Hamilton Field, Calif.

Dallas Pushes Sidewalk Repairs

Friendly letters to property owners aid wartime program designed to do "stitch in time" walk renovation without use of critical materials

By J. T. CONROY
Acting Director of Public Works, Dallas, Texas

DALLAS is like any other city, in that many of its sidewalks are reaching the stage where they must be repaired or replaced. Tree roots, buckling—just wearing out—whatever the cause, a dilapidated walk is a neighborhood liability, working against property values. Often, prompt action on repairs will save a considerable sum for property owners who, however, being human, are likely to put off the task indefinitely unless given a timely "nudge."

"Nudging" Tactics

The City of Dallas, finding its repair crews could carry along a certain volume of sidewalk repairs, despite the general labor shortage decided this year to put on a sidewalk repair and replacement campaign. Dallas property owners are required to pay for their sidewalks directly. However, to engage their interest and obtain their cooperation, the city is offering to repair these walks with city forces, at cost.

The first step in the program is to compile a list of locations where repairs are needed. This work is done by the four maintenance superintendents, as they are more familiar with sidewalk conditions, and are able to locate the worst places first. A friendly but firm letter is sent to each owner, asking him to cooperate with the city by repairing his walk. A sample of this letter is shown. We gave due time and consideration to its preparation, and believe that it combines two very important elements—human appeal and practicality. It briefly outlines the imperative need, gives an estimate of the cost of repairs if done by city forces, and extends to the owner the privilege of having it done by a bonded contractor, if he chooses. By avoiding a suggestion of force, and emphasizing civic pride and the enhancement of property values, our response to this letter has been approximately 50 per cent. A second letter is sent the owner by the city, if the first one brings no reply. In this one, we maintain our friendly attitude, but make clear the fact that we are expecting results. It carries no threat, and further explains the necessity for the work, re-

This business property frontage will have a new spic-and-span look when city has completed repairing sidewalks. Part of Dallas' current program

CITY OF DALLAS
TEXAS

DEPARTMENT OF PUBLIC WORKS
J. T. (Tom) CONROY
DIRECTOR

V. R. SMITHAM
ACTING CITY MANAGER

March 17, 1944

Mr. John Doe

1015 Blank Street

Re: Sidewalks at 1015 Blank Street

Dear Sir:

The sidewalk located at 1015 Blank Street in front of your property is

in need of repair. In order to correct this condition, it will be necessary to make the following expenditures:

50 lineal feet of sidewalk	@	.80	$ 40.00

We shall be glad to correct this condition, using City forces, upon receipt of your check for $ 40.00 . If you prefer, you may employ a bonded contractor to do this work, but you are requested to notify this office before the work is started. This is in order that the contractor may be instructed as to the City's requirements in this construction.

We feel that you will see the necessity for this improvement, and accordingly are expecting your full cooperation.

Very truly yours,

J. T. Conroy,
Acting Director of Public Works.

By
F. M. Miller

FMM:H

WHEN SPLIT SECONDS Count!
To smash strafing planes coming in fast from any angle, self-powered multiple mounted machine guns enable gunners to concentrate on hitting the targets, while speedily and effortlessly the guns are swung around, raised or lowered. One more service stripe for the hundreds of thousands of Briggs & Stratton engines now with our armed forces.
THE urgent necessity of dependable power for purposes never before imagined, have revealed the amazing versatility of Briggs & Stratton 4-cycle, air-cooled gasoline engines. Their stamina, rugged dependability and superior performance under circumstances rarely encountered in peacetime, have demonstrated Briggs & Stratton high standards of quality in precision manufacture, and substantiated their recognition as "the world's finest air-cooled gasoline engines."
Our years of experience in design and production of air-cooled engines is again available to you on present problems or in your planning for postwar gasoline engine requirements.
"It's powered right—when it's powered by Briggs & Stratton."
BRIGGS & STRATTON CORP.
MILWAUKEE 1, WISCONSIN, U.S.A.
BACK THE INVASION
BUY WAR BONDS
4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES

peating in substance the message of the first letter, continuing as follows:

"There is no doubt some good reason why we have not heard from you on this matter. However, the urgent need for this improvement causes us to insist that you make arrangements to have the work done within thirty days from the date of this letter. Otherwise, we will proceed to do the work with city forces, and assess a lien against the property to cover the cost. Your prompt attention will prevent the additional expense which will accrue should we be forced to follow the latter procedure."

Since the assessment procedure is quite involved and undesirable, it is avoided if at all possible. After the specified time has expired, the city contacts each owner individually, reminds him of the possibility of assessment procedure, and assures him the city's desire to conclude the matter in a friendly and cooperative manner. This latter group comprises owners willing to pay within 30 to 60 days, those who have not received the letters, those who entertain some hope of being overlooked by the city, and those who absolutely refuse to pay, and must be assessed for the cost.

This program has greatly stimulated sidewalk repairs. Property owners are depositing between $1,000 and $1,500 weekly with the city for this work. Added to this are the deposits of unsolicited owners who, seeing the crews at work in their neighborhood, stop by and ask that their walks be repaired. These are given estimates of the cost of the work requested, and when the money is received, our crews proceed with the repairs.

Since each individual request has to be worked to a conclusion, payment or assessment, there is a limit to the number of jobs that can be handled at one time. However, as the jobs are worked off, others are added, and this procedure will be followed until all the walks are in good condition.

▼

Marshall County, Iowa, has adopted, and has received State Highway Commission approval of, a three-year road construction program, according to County Engineer F. W. Sarvis. This program consists of a total expenditure of $223,619, and includes the following:

Surfacing, deferred application 51.69 miles, $14,433.

Surfacing, original application 48.06 miles, $56,147.

Bridges, culverts & grading, 48.81 miles, $153,039.

Equipment Maintenance

Notes on Kansas State Road Equipment

By L. L. MARSH
Engineer of Maintenance
State Highway Commission of Kansas,
Topeka

THE Kansas highway commission, under superintendent of equipment W. H. Jury, is making good progress in its salvaging program even though greatly handicapped by not having needed shop equipment such as crankshaft grinders, precision milling machines, case hardening equipment, etc. We find that we can salvage many parts with our machine equipment used previously only for emergency repairs; and together with cooperation from the local machine shops, our salvage and repair program is bigger even than in 1943.

Our equipment this year is one year older, but every piece is in operation or in process of being repaired. No equipment is being junked and none has been replaced since the war, with exception of a few automobiles. No new trucks or motor graders have been purchased; however, we are badly in need of both and are still hoping to obtain a few as we feel we are reaching a climax on salvage repairs on some units.

New Maintenance Manual

Our Department practiced preventive maintenance in pre-war times; we had our operators and mechanics schooled in this economy program. However, since war began we have put considerably more pressure and thought to our preventive maintenance program. We have had our own equipment manuals for care and operation of various types of equipment for six years and these have been revised and improved for our war-time program. Our pre-war requirements on cleaning air cleaners, cleaning oil filters, cleaning cooling systems, protecting painted surfaces, periodical changes of oils and greases, wheel packing, tire inspection, tire matching, etc., has been revised and improved even since the first of the year. Recapping tires was begun about six years ago and that experience is proving of great value. Even since the first of the year, we have installed wider rims on some vehicles to help in conserving the few tires we have.

In repair salvaging we have adopted the use of metalizing and regrinding of crank shafts and other types of shafts. Our men are welding teeth in gears, welding used grader blades together, salvaging our own brass and making war-bronze for bushings, have replaced some worn-out bronze bushings with cast-iron bushings and many other operations that were considered unnecessary in peace time.

Sleuthing for Parts

To simplify the process of locating available emergency repair parts, we recently started the following procedure: Within our six divisions, each covering from 17 to 20 counties, we have on our payroll 33 traveling mechanics; at any time a chief mechanic of one division cannot locate a badly needed emergency repair part within his division he immediately notifies my office at Topeka and my office in turn notifies every mechanic throughout the state, giving them the parts number, make and description of the part and description of the vehicle for which the part is to be purchased.

If the part is located by any mechanic the person needing the part is immediately contacted and the purchase is made. By having these traveling mechanics located throughout the State, they have occasion to have access to a lot of supply and repair parts dealers. Even salvage companies are contacted if need be. We are having fine success with this program.

Making Labor-Saving Units

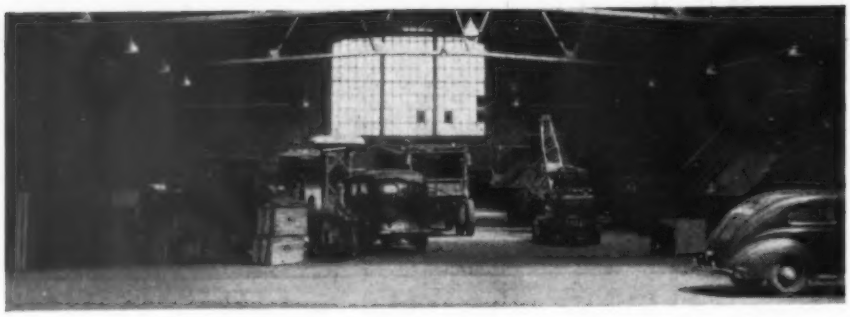
To cope with the extreme shortage in labor, we are constructing our own designed front-end tractor loaders, bituminous mixer loaders, and gravel unloaders for use in unloading gravel from freight cars. These processes not only save labor but save considerable extra miles of travel on fleet trucks and the transportation of men and heavy road equipment.

The parts situation, as far as available new repair parts are concerned, is of course better than last year. Since inaugurating the above system of acquiring parts, most parts can be obtained within a week or ten days. However, a few parts are exceptionally hard to obtain, such as gears for power shovels, some motor grader repairs and some types of carburetors for heavy equipment.

Old Graders Modified

The Commission is unfortunate in having a large number of old motor graders purchased 12 to 14 years ago. Many were built for low grades of fuel and have proven uneconomical on present fuels. We have overhauled the power plants, increased the compression ratios with high-altitude pistons, changed the manifolds from hot type to cold type, and replaced the carburetors and governors. In making this conversion it has been necessary to increase the power and economy of the graders. The shop men have also converted a number of oil burning engines to gas at the time the units were in need of general overhaul. These units also showed considerable increase in power and economy. These motor graders are dual-tired units and are satisfactory for road surface maintenance only; they are absolutely worthless for ditch work or regrading.

We are keeping our fingers crossed and pushing our preventive maintenance program with all we've got in the hope that our 1944 Program will include, particularly, some new trucks and motor graders. Looking at the situation with extreme optimism, we feel that it will be necessary to replace 25 per cent of our truck and motor grader equipment and, due to the extreme shortage of labor, it is very evident we will need additional road oil and bituminous material mixing and loading equipment. The past wet Spring and early summer have certainly been tough on road conditions.



Massachusetts' new maintenance shop—north and where machinery and four-wheel drive trucks are repaired

Massachusetts Reorganizing Road Repairs to Save Equipment and Labor

Reports J. E. Lawrence, Maintenance Engineer, Massachusetts Department of Public Works, Boston:

This department is doing considerably more salvage and repair work than in 1943. This is required because of the increased age of the equipment due to the lack of replacements. This might be classed as a new policy which has been instituted because of necessity, as we have found in normal times that a program of frequent replacements has been more economical than a policy of keeping old equipment in service, and being forced to make repairs at times when the equipment is most needed.

In making our repairs it has been necessary at times to dismantle one piece of equipment to provide parts for several others. The parts for our various pieces of equipment have been available for the most part with slight delays. The most noted exception is motor parts which seem to be becoming increasingly difficult to obtain.

Our equipment today is in fair to good condition with a piece here and there that must be replaced within a short period. There is some additional equipment needed, however, due to the shortage of labor. Sand loaders, for example, are needed for snow removal work during the winter and material spreaders are needed during the summer to compensate for the labor shortage. Surface treatment schedules have been stepped up to prevent such repair work as patching which requires a large percentage of labor.

Non-essential work has been eliminated and roadside work, such as mowing grass, has been curtailed. The labor formerly used for this work has been transferred to the regular maintenance gangs which, in some cases, have been reduced to two or three men. When projects requiring several men, such as surface treatments, are attempted, it is necessary to combine the crews of two or more sections.

The department's Maintenance Shop at Boston was well equipped and desirably located and at the request of the Army was turned over to them.

The move to another state-owned building was made last November, but due to governmental restrictions and delays, the necessary installations of shop equipment have not yet been completed.

* * *

California Would Replace $2,000,000 in Equipment

R. H. Stalnaker, Equipment Engineer, California Department of Public Works, reports:

A few months ago the Department purchased metal spraying equipment and is building up crankshafts, miscellaneous shafts, pistons, and other cylindrical parts by this method. We have not as yet attempted the building up of any parts which could not be chucked in a lathe. This applies to all our equipment from passenger cars to power shovels.

While conserving our equipment in every way possible, there have been no definite changes in policy over 1943 except possibly a stricter enforcement of orders against overloading equipment.

There are still serious shortages and much of our equipment is laid up a long time awaiting the receipt of repair parts. Some parts causing considerable delay.

Resilient motor mounts, transmission and differential gears, and universal joint parts for trucks, transmission gears and clutch parts for motor-graders, and certain sizes of tires, particularly tires for driving wheels of motor-graders.

A considerable portion of our equipment has now been in use for a number of years, and much of it should be replaced as soon as possible. It would be impossible to determine the exact percentage of such equipment, but I would hazard an estimate that, if we were able to do so, at least one-third of our equipment, about $2,000,000 worth, would be replaced now if new equipment were available.

* * *

Maine Sends Mechanic Foremen on Road

From A. W. Blaisdell, Manager, motor transport division, Maine Highway Commission:

We haven't been able to go into too much detail in our preventive maintenance schedule, on account of the labor shortage. Our latest plan is to take the foreman of repairs on light trucks and the foreman of repairs on heavy trucks away from the garage two or three days each month and have them make a check of the equipment on the road.

The parts situation has eased up to some extent, except in some of the light type of trucks on which we are still unable to get much service at this time. Repair parts for motors are especially hard to get and this applies to all types of motors both large and small. The electric system and parts which are used on motors are especially hard to get and such things as repair kits for carburetors and generators are almost entirely off the market as far as we have been able to obtain them. We haven't been able to do a great deal about securing these parts except that we have gone into small localities where these repair parts are used and where the demand for them has not been as great as it is in the larger communities. In this way we have been able to pick up sufficient parts to keep us operating up to the present time. In other words it has been a hunt-and-find system rather than any other method we could use.

The general condition of our equipment is good on our heavy Four Wheel Drive trucks with few exceptions. Our light equipment, including small trucks, runs from fair to poor. Our shovels, graders, distributors, snow plows, and so forth, are in generally very good condition.

Considerable saving has been made on snow plow and grader blades by seeing that they are kept tight on the mold boards as well as by welding worn-out sections together and reusing them.

* * *

W. P. Divers, County Engineer, Fulton, Mo., reports that he is working continuous sections this year to conserve labor and machinery. Also trying to "do less empty handed driving from place to place."

R. O. Lewis, State Superintendent, stores and procurement, West Virginia Road Commission, Charleston, reports:

The Commission is doing more salvage or repair work on equipment now than in 1942. We have recently junked a number of units, operated part time in 1943, but the reduction is almost evenly offset by the increase in age and consequent need of repairs of the remaining items. Our inability to compete with private industry for skilled mechanics has decreased the efficiency of our shops and increased our operating cost. Parts have gone up in price and are often difficult, if not impossible, to obtain. Much of our equipment is of an advanced age and requires continual repairs. Each of these factors tend to make it more and more difficult to keep our equipment in operating condition.

* * *

L. V. Good, Senior Equipment Engineer, Pennsylvania, writes:

We follow a very rigid program of preventive maintenance. Where manpower is available, we have a special man at night, who periodically checks all the equipment and reports to the foreman any immediate adjustments or repairs that should be made. This has saved us many thousands of dollars in repair bills and has prolonged the life of our equipment materially.

* * *

By Maloy Quinn, County Engineer, Clay County, Clay Center, Kansas:

As to obtaining our parts and supplies we have been rather fortunate —roller and ball bearings being the only items we have had to wait for an undue length of time.

Our equipment, from outward appearances, will last for the year 1944. However, it resembles the venerable "One Hoss Shay" and just when that "last straw" will be here we can only guess. Eighty per cent plus should have been replaced in 1943.

* * *

Writes O. E. Billeter, Road Engineer, Clark County, Winchester, Ky.:

We maintain a well equipped shop and do all of our welding, and repairing, and make some parts that can be made in shop. Our equipment is pretty well worn out and will have to be replaced with new after the war.

The past two years we have done nothing but maintenance. Our bituminous or black top roads we maintain with skin patch and resurface the very worst places, our traffic bound macadam roads we add some crushed stone where needed and keep them graded and well ditched.

Because of the high cost of labor and materials we have spent all of our revenue for the past two years. After the war is over most of our roads will have to be resurfaced.

* * *

C. L. Motl, Maintenance Engineer, Minnesota department of highways:

Our department is looking into the possibilities of renting privately owned equipment to help carry out its summer program, which in some cases may even permit us to put our own equipment in storage temporarily. We are, of course, going forward with a rather thorough and complete overhauling program, and this together with the very mild past winter, in which very little snow plowing was required, will place us in a very good position for the next year or two.

That's a Swell Way to Kill an American Soldier

YOU would be madder than hell if you knew some operator who bought a jeep—abused it terribly—then threw it away when ¼th of its usefulness was gone. You would cry "Sabotage" because you know the soldiers on our 57 variety of fronts *need* jeeps. Well—pictured here is a comparable crime. This abused and discarded reel of wire rope probably cost about as much as a jeep—and wire rope is sorely needed by our armed forces. This sort of criminal carelessness is akin to sabotage. It is a needless waste of valuable material—and, mister, that is a swell way to add more names to American casualty lists. Not impossibly the name you add might be your nephew, or the kid who used to live up the street, or the lad who used to drive your grocer's delivery truck.

Manifestly this is a reel of preformed wire rope because the ends have no seizing wire; in spite of the snarled condition of the rope there are relatively few dog-legs or kinks, and there are no broken crown wires porcupined to tear men's hands or clothing. Fully one-half (and probably more) of the rope's usefulness is yet on the reel, but even this has been rewound carelessly, then left in the dirt and mud to rust and destroy itself. The guy who left this rope in this condition should have been fired, then inducted into the infantry and given a winch truck to drive, if only to teach him the priceless value of steel cable. In this reel of discarded rope there are long lengths of perfectly good cable, well suited to boom line service, guy lines, hand rails, or any one of a dozen other applications.

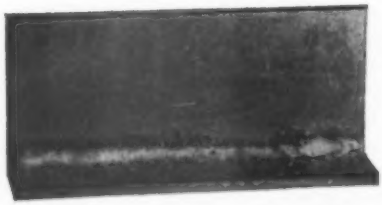
In direct contrast to this type of Hitler-Tojo-aiding waste is the scene at the right, where is shown four reels of wire rope, properly mounted above mud and grit and in such a way that needed lengths may be taken from the reels in straight, non-kinking manner. Here is a contractor who thinks with his brain instead of his brawn. Even here, in this workmanlike storage of rope, a roof extension from the adjacent shed would provide a rain shelter for the four reels. Wire rope is an intricate, precision-made machine having many inter-related parts. As such it deserves proper care and maintenance.

Welding manganese points on dippers teeth in the field shop of H. F. Wolfe Construction Co., which has been busy this spring grading for runway extension at Warner Robins Air Depot near Macon, Georgia

How're Your Welders Doing?

Welding Current Too Low

Welding Speed Too Fast



Welding Current Too High

Welding Speed Too Slow

Arc Too Long (Voltage Too High)

Proper Current and Timing

REMEMBER . . .
These 3 prime factors for proper welding
1—Correct Electrode
2—Correct Travel Speed
3—Correct Welding Current

Fig. 1. Proper and imperfect fillet welds

IT'S WELDING that keeps the world turning these days in many a highway equipment shop and on many a construction job. "Near miracles" have been performed since the war with torch and arc equipment, the general spirit being reflected by the mechanical foreman who said, "Hell, our boys can weld anything."

Yes, welding has a wide application, and that is all the more reason for engineers or superintendents who are not in themselves welding experts to double-check now and then on how well the work is being done. One of the best aids in a review of welding fundamentals is the little "Welders' Vest Pocket Guide," published by Hobart Bros. Company, Troy, Ohio, and available on request. The following advice and accompanying illustrations are reprinted by permission.

Three Welding Essentials

Proper procedure in electric welding depends on three essentials—correct electrode, correct travel speed, and correct welding current. For really "fast welding," the proper technique must be worked out that will observe these essentials so as to deposit every ounce of malted electrode usefully in the joint.

Quality of Weld

Besides the steady frying and crackling sound that a correct arc produces, the shape of the molten pool and the movement of the metal at the rear of the pool serve as a guide in checking weld quality. In a correctly made deposit the ripples pro-

TYPICAL DIESEL LUBRICATION PROBLEMS:

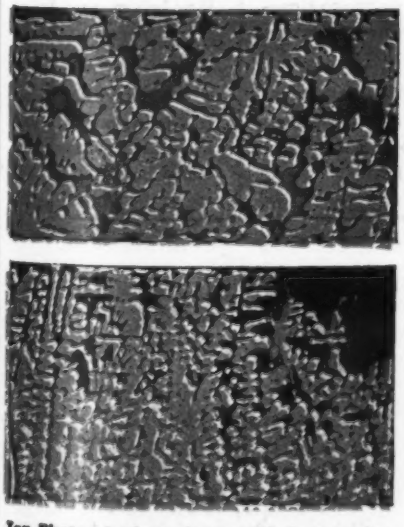
2. Bearing Corrosion

The high speeds of automotive Diesel engines have increased the loads on bearings to such an extent that copper-lead and other alloy bearings are widely used. These bearings, although able to withstand far greater pressures and higher temperatures than the conventional babbitt type, are subject to corrosion.

These same conditions of pressure and temperature promote a reaction between the lubricating oil and the air in the crankcase. When a hydrocarbon lubricating oil is exposed to oxygen at elevated temperatures, the oxygen atoms combine with the oil molecules. With some lubricating oils, this reaction causes them to become corrosive.

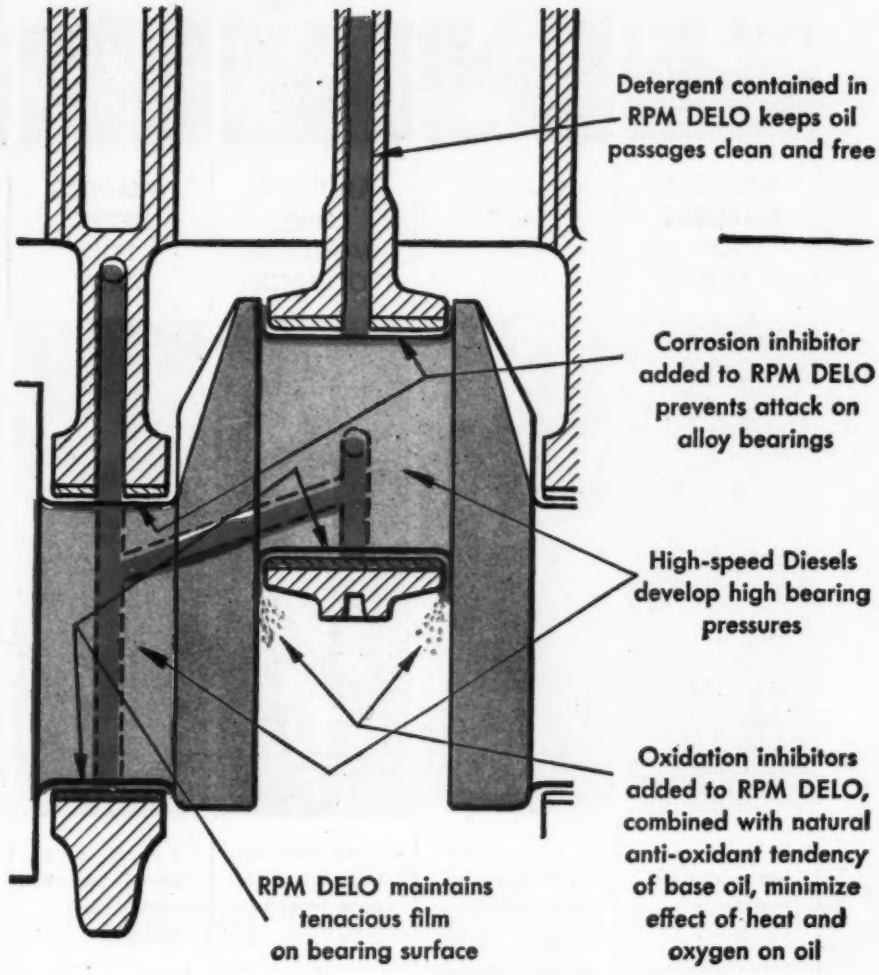
The products formed in this reaction tend to dissolve the lead in the copper-lead structure of the bearing, leaving a porous copper shell which breaks down under pressure.

This tendency, which presents a serious problem to operators of high-speed Diesels, can be entirely overcome through use of RPM DELO in accordance with the recommended procedure.



Top Photo: A photomicrographic cross-section shows the lead component of a new copper-lead bearing in light grey. The copper is shown as red. Note the even distribution throughout.

Bottom Photo: A similar cross-section corroded by use of straight, uncompounded mineral oil. Note how lead has been eaten from surface, leaving copper honeycomb.


Detergent contained in RPM DELO keeps oil passages clean and free
Corrosion inhibitor added to RPM DELO prevents attack on alloy bearings
High-speed Diesels develop high bearing pressures
Oxidation inhibitors added to RPM DELO, combined with natural anti-oxidant tendency of base oil, minimize effect of heat and oxygen on oil
RPM DELO maintains tenacious film on bearing surface

Diagrammatic sketch of connecting rod and crankshaft bearing assembly illustrates one section of engine where RPM DELO reduces overhaul and repair expense.

RPM DELO, in addition to its other properties, prevents bearing corrosion in three separate ways:

1. The base stock of RPM DELO contains natural inhibitors which are highly resistant to oxygen, and minimize the original tendency of all mineral oils to oxidize under heavy-duty conditions.

2. A powerful oxidation inhibitor is added to RPM DELO, which further reduces the rate at which the oil absorbes oxygen.

3. Direct protection is given to the bearing by the corrosion inhibitor added to RPM DELO.

Even more important than its non-corrosive property, is the ability of RPM DELO to eliminate ring-sticking, prevent excessive deposits on rings and ports, and minimize ring and cylinder wear.

RPM DELO has world-wide distribution and is marketed under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial RPM DELO (concentrate). Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity.

RPM DELO

STANDARD OF CALIFORNIA

LOOK AT YOUR WELDS! They tell their own story. Check 'em with this chart.

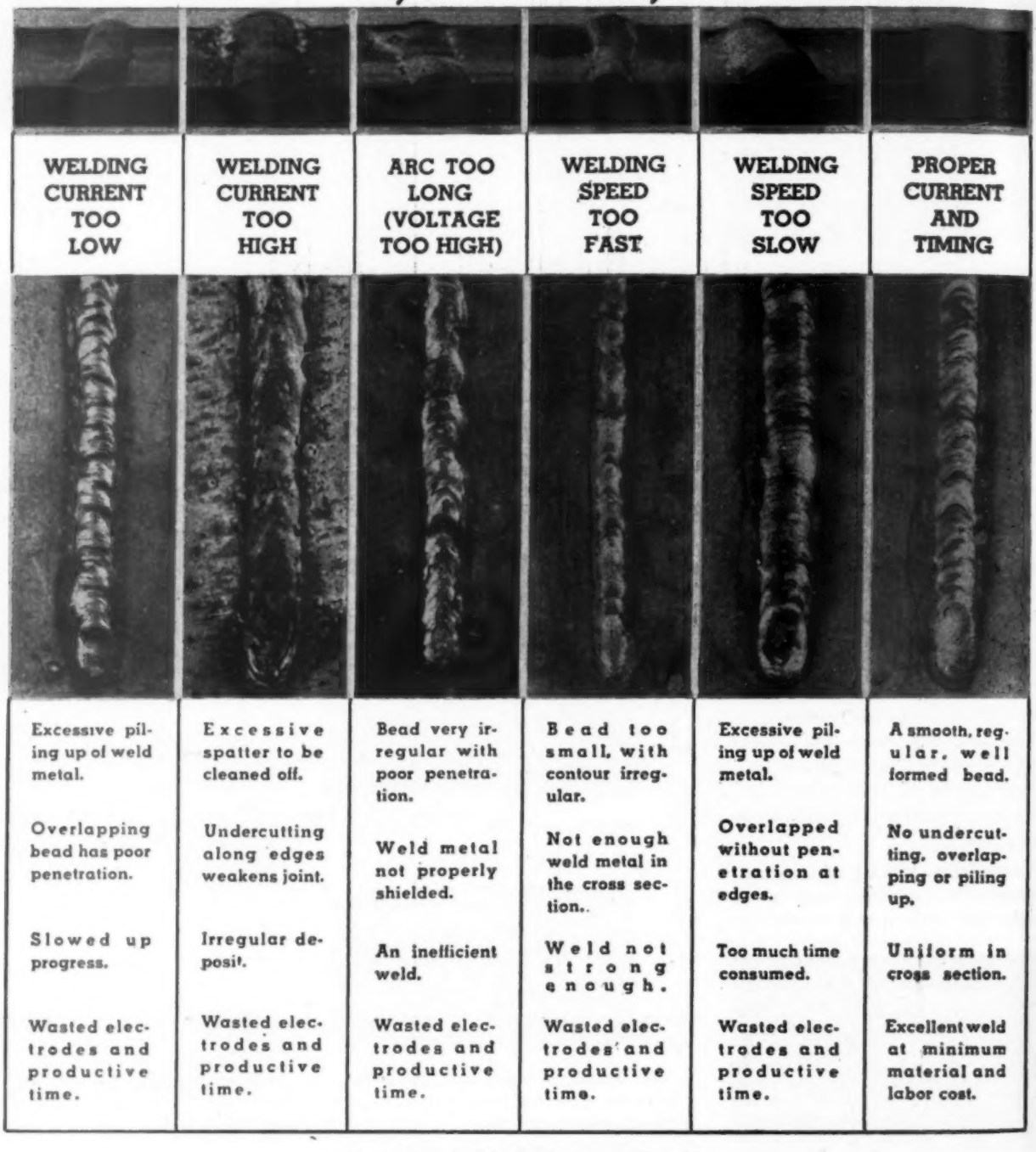

WELDING CURRENT TOO LOW
Excessive piling up of weld metal.
Overlapping bead has poor penetration.
Slowed up progress.
Wasted electrodes and productive time.
WELDING CURRENT TOO HIGH
Excessive spatter to be cleaned off.
Undercutting along edges weakens joint.
Irregular deposit.
Wasted electrodes and productive time.
ARC TOO LONG (VOLTAGE TOO HIGH)
Bead very irregular with poor penetration.
Weld metal not properly shielded.
An inefficient weld.
Wasted electrodes and productive time.
WELDING SPEED TOO FAST
Bead too small, with contour irregular.
Not enough weld metal in the cross section.
Weld not strong enough.
Wasted electrodes and productive time.
WELDING SPEED TOO SLOW
Excessive piling up of weld metal.
Overlapped without penetration at edges.
Too much time consumed.
Wasted electrodes and productive time.
PROPER CURRENT AND TIMING
A smooth, regular, well formed bead.
No undercutting, overlapping or piling up.
Uniform in cross section.
Excellent weld at minimum material and labor cost.

Fig. 2. How to tell what is wrong with welds

duced on the bead will be uniform and the bead will be smooth, with no overlap or undercut.

Arc Too Long or Too Short

If the arc is too long, the metal melts off the electrode in large globules which wobble from side to side as the arc wavers, giving a wide spattered and irregular bead, with poor fusion between original metal and deposited metal.

If the arc is too short, there is not enough heat to melt the base metal properly and the electrode quite often sticks to the work, giving a high, uneven bead, having irregular ripples with poor fusion and a slag and gas holes. (See illustrations in Fig. 2.)

Arc Blow

A condition is sometimes encountered where the arc tends to waver from its intended path—this is known as arc blow. The waver is caused by magnetic fields set up around the work and electrodes. It may be counteracted by changing position of electrode in relation to work, or changing position of ground in relation to work, or by welding away from the ground.

Results of Incorrect Current

If current on machines is too high or too low, you are certain to be disappointed in your weld. If too high, the electrode melts too fast and your molten pool is large and irregular. If too low, there is not enough heat to melt the base metal and your molten pool will be too small, will pile up, look irregular.

Travel Speed of Electrode

When your speed is too fast, your pool does not last long enough, impurities and gas are locked in. The lead is narrow and ripples pointed. When speed is too slow, the metal piles up, the bead is high and wide, with a rather straight ripple.

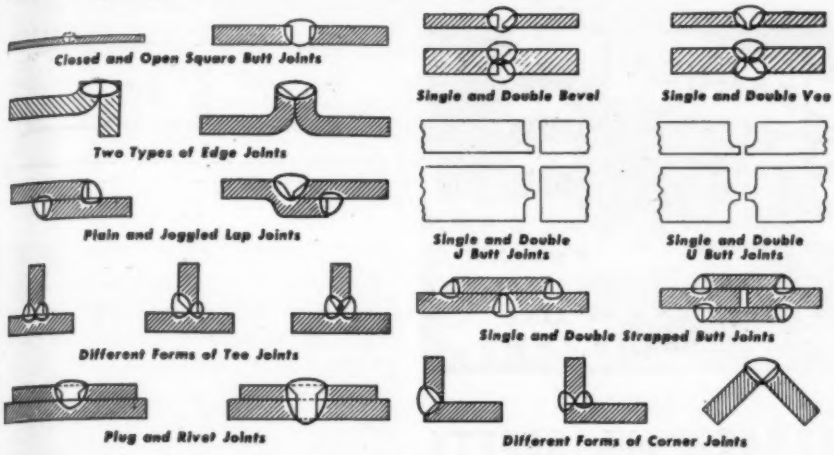

Closed and Open Square Butt Joints
Single and Double Bevel
Single and Double Vee
Two Types of Edge Joints
Plain and Joggled Lap Joints
Single and Double J Butt Joints
Single and Double U Butt Joints
Different Forms of Tee Joints
Single and Double Strapped Butt Joints
Plug and Rivet Joints
Different Forms of Corner Joints

Fig. 3. Types of joints

Metals and Electrodes

Although electric arc welding is done mostly on mild steels, many other metals and alloys are being welded. In the former class are rolled steel and cast steel. The latter group includes chrome steel, chrome-nickel steel, manganese steel and bronze, brass and aluminum, etc. Various alloys react differently under influence of the welding arc, therefore, a definite procedure must be set up for the particular metal to be welded. In addition, an electrode usually of the same composition as the base material must be used. There are two general types of electrodes—the "bare" or lightly coated type, and the heavily coated type. The latter has a heavy coating of material which acts to shield the molten metal from oxidation or contamination by the surrounding atmosphere and also helps to stabilize the arc. Where the ductility, impact resistance, etc., obtained with heavily coated electrodes are economical, you must base your choice on the results to be obtained.

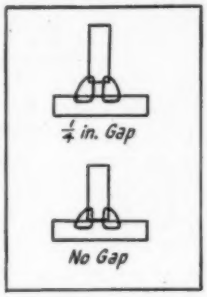


Fig. 4

Proper Fit-Up for Fillet Weld

Sketches at right show graphically the importance of close fit-up. It is far more economical to fill spaces with work metal than with the more costly electrode material, which not only costs more per pound but also involves the cost of melting down in the arc. (See Fig. 6.)

The Fillet Weld

A fillet weld consists of one or more beads deposited in the angle formed by two plates. When only one fillet is involved in a joint it is called a single fillet. A double fillet involves two fillets to the joint. To help you in fillet welding, Fig. 1 shows how to tell good and bad jobs.

Proper Angle for Fillet Weld

Generally speaking, when making a fillet weld, the electrode should be held so that it bisects the angle between the plates (Fig. 5) and is perpendicular to the line of weld. This rule should not be slavishly followed, however. The good operator learns to manipulate the electrode in the way that makes it easiest for him to get best results under all conditions. It is

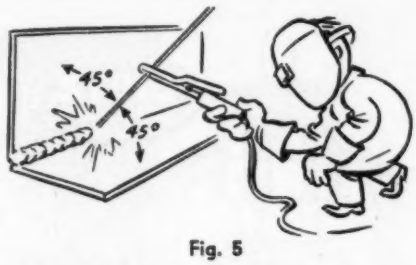


Fig. 5

RESULTS that dictate the proper welding technique always.

For example, it may be found that under certain conditions a slant of not over 5°, with the electrode pointing back toward the crater, helps cause the slag to wash back and float to the top of the weld (Fig. 6). Some operators find that this position also helps to overcome any tendency to undercut the plates along the edge of the weld.

Economy of Double Vee Joint for Butt Weld

On plates heavier than ⅜ in. where it is possible to weld on both sides, a definite economy can be made by using the Double Vee method. (See Fig. 3.)

Use Largest Electrodes Possible

Larger size electrodes increase welding speed and cost you less per pound. At the same time, you help

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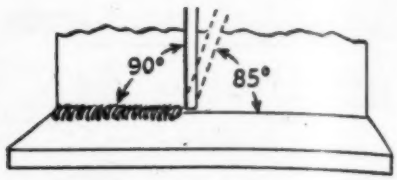


Fig. 6

keep more welders in full time operation because manufacturers can produce the larger sizes in greater quantities.

Cut Electrode Waste

Melt every rod down to the last fraction of an inch. Cap your new electrode with the stub of the one just used. This procedure will enable you to use an inch or two more of every electrode. You "cap" your electrode by shortening on the bench so that old and new ends are frozen together.

Spray Booth Speeds Repainting Protects Workers, Saves Space

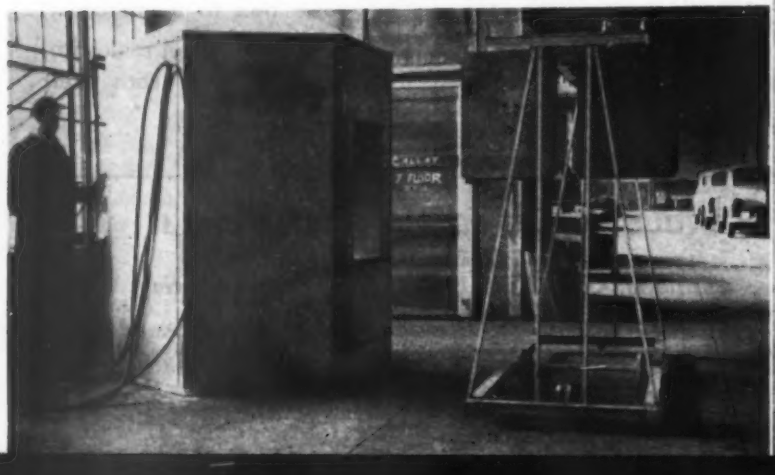
MAINTENANCE and repainting of certain street signs is one of the functions of the Central Motor Repair Shop, where the New York City Department of Sanitation takes care of its motor fleet. Facilitating painting is a spray booth of a special design worked out by members of the staff.

As shown in the accompanying photo, instead of a conventional spraying room, it consists of a small booth, providing just enough space in which to hang one or more signs or other small objects to be painted. The spray gun operator holds his nozzle through a window. An 18-in. diam. suction pipe leading down through the floor under the booth and passing up through the building roof protects the operator from spray or fumes.

The booth is hexagonal in plan, of a simple, inexpensive structural design comprising sections of heavy sheet metal held at corners and joined to the roof strips of angle iron. The edges of the two windows are metal trimmed for strength and protection against damage in passing objects in and out.

The booth is located in one quarter of a spacious sign room, in which is also located mobile handling and drying racks also designed by the Department staff (see photo), and a solution tank for stripping old paint. The foregoing information courtesy William F. Carey, Commissioner of Sanitation of New York City, and Edmund A. Donnelly, Assistant to Commissioner.

With this specially designed sign painting booth the spray operator is on the outside looking in. Note its compactness. Fumes are drawn down through an 18-in. suction pipe in the floor



Traffic Engineers to Meet in Chicago—The 15th Annual Meeting of the Institute of Traffic Engineers will be held at the Sherman Hotel, Chicago, Ill., Oct. 1, 2, 3, and 4. Wilbur S. Smith, 60 John St., New York, N. Y., is secretary-treasurer.

▼

In Pennsylvania—How overhauled motors are crated for shipment out over the state, and how they are handled over the shop floor, is shown in this scene snapped at the Pennsylvania Highway Department's headquarters shop at Harrisburg. A carefully laid out overhead hoist rail is a big labor saver in this shop

Price Regulation for Reinforcing Bars Revised

Revision of the price regulation for steel bars used to reinforce structural concrete buildings, bridges, roads and other structures—was announced June 2 by the Office of Price Administration.

One of the principal changes effected by the revised regulation is to extend coverage to sales by resellers, who are given the same ceilings as those already established for fabricators. Resellers include brokers or warehouses who purchase fabricated reinforcing bars for resale, particularly in connection with furnishing various other materials for construction jobs.

Only one important pricing change is made, a reduction of 2c per 100 lb. in the delivered price of reinforcing bars at Toledo, Detroit and Eastern Michigan, and at Gulf Port basing points to reflect the revocation of the 6 per cent increase in freight originally effective March 13, 1942.

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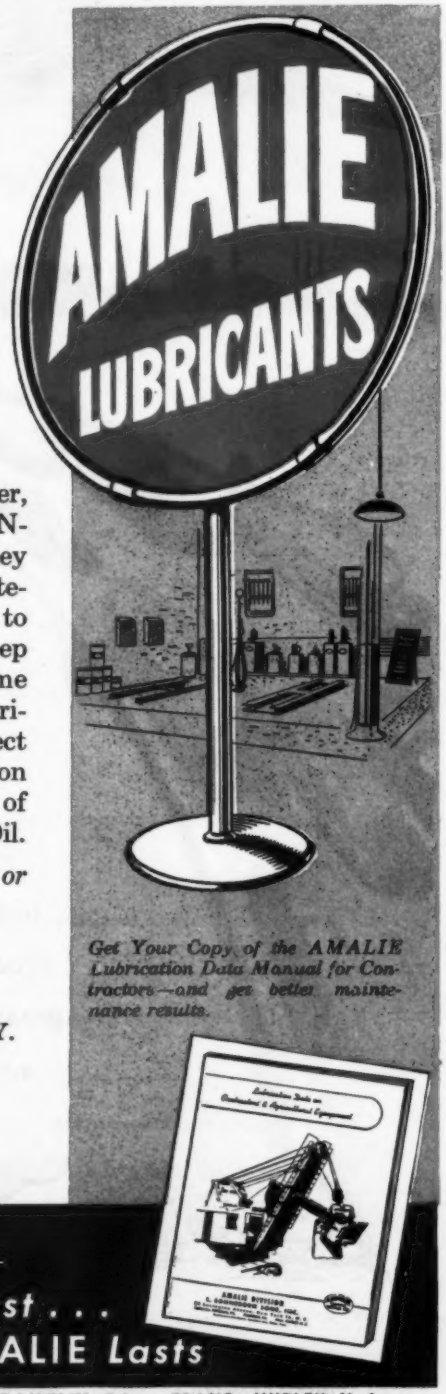

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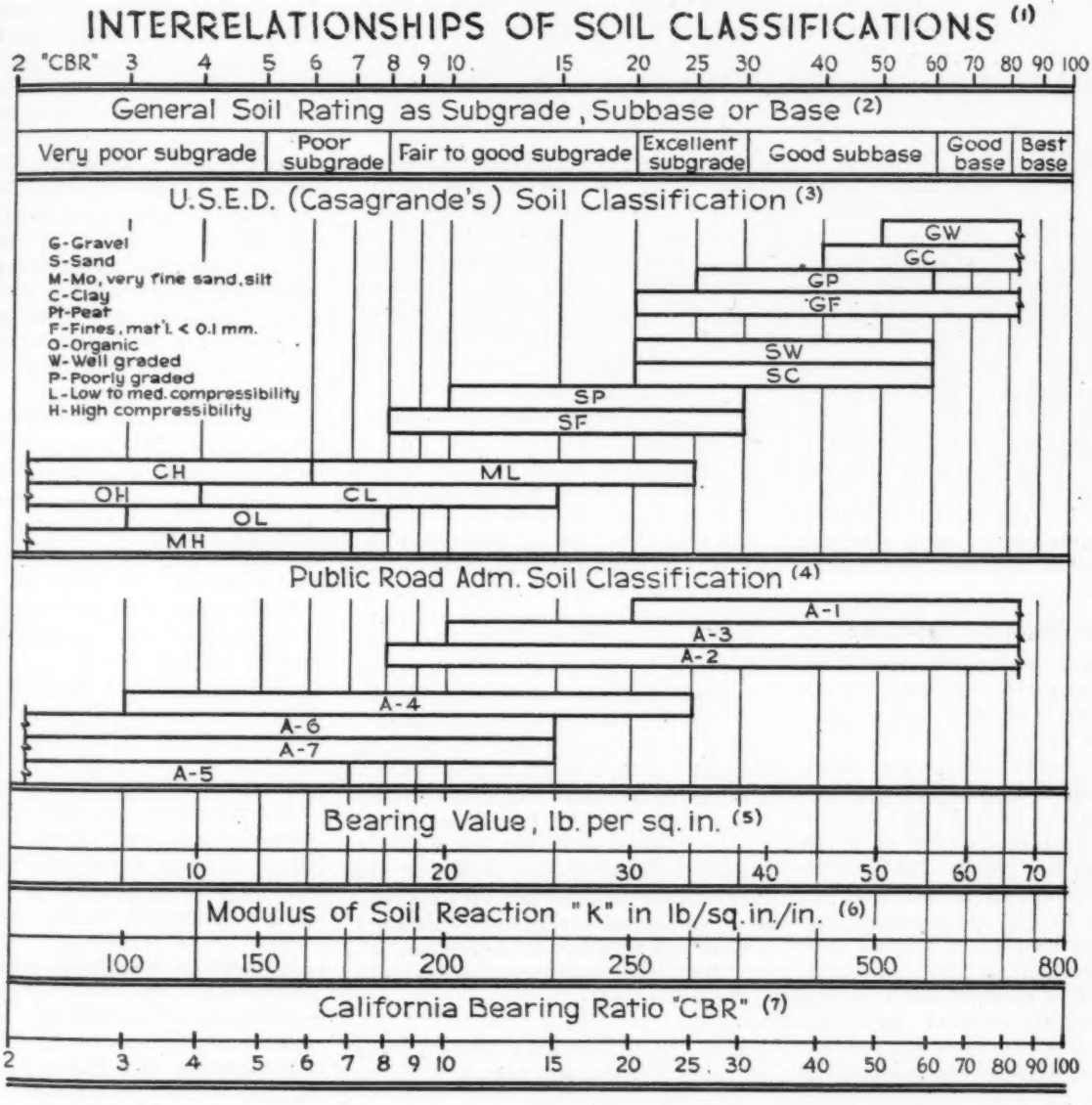
Interrelationships of Soil Classifications,

California Bearing Ratios, Bearing Values, and "k" Values

[This article represents extracts from a talk "Soil Classifications and Characteristics," given by Earl J. Felt, Soil Cement Bureau, Portland Cement Association, before a joint meeting of the Chicago Engineers Club and The Illinois Section of A.S.C.E., Feb. 10, 1944. In the past nine years the Association has tested over 3,500 soils from all parts of the U. S. and from several foreign countries.—Editor.]

WHEN the U. S. Engineer Department started a nation-wide airfield construction program in 1941, there was no generally accepted method for designing flexible pavements. The Engineer Department, therefore, undertook a series of investigations to determine a practical method for designing such pavements; and also to check the Westergaard Analysis which was widely applied to the design of portland cement concrete pavements.

As a result of these investigations, the California Bearing Ratio test was adopted for the design of flexible pavements; and the field bearing test for determining Westgaard's modulus of soil reaction "k" and the use of this value in Westergaard's center loading formula was adopted for the design of concrete pavements.



(1) All interrelationships are very approximate. Actual field and laboratory tests are required to determine "k", "CBR", and bearing values.
(2) See "Foundations for Flexible Pavement" by O.J. Porter, 22nd An. Mtg. Highway Research Board, 1942, for basic idea.
(3) See Engineering Manual, Chapter XX, March 1943, War Dep't., Office of the Chief of Engineers. See also, "Soil Tests for Design Runway Pavements", by Middlebrooks & Bertran, 22nd An. Mtg. H.R.B. 1942.
(4) See item (3), A-6 and A-7 soils cut off at CBR=15, rather than 25 as indicated in Chapter XX. CBR for A-5 soils of volcanic origin etc. may range above 7 and go as high as +80.
(5) See second reference of item (3), page 184. Bearing values measured at 0.1 in. deflection. Bearing plate area not given.
(6) See item (3). "k" is factor used in Westergaard's Analysis for thickness of portland cement concrete.
(7) See items (2) and (3)

It is realized by all paving engineers, including personnel of the U. S. Engineer Department, that the design methods used by the Engineers are undergoing constant development. This is particularly true in the case of flexible pavement design, a field in which there is a continual search for better design methods.

Some time after the Engineer Department entered into the airport paving field they adopted a soil classification scheme developed by Dr. Arthur Casagrande of Harvard University. This system utilizes the liquid limit and plastic limit tests in a way similar to the Public Roads Administration soil classification scheme. However, a considerable wider grouping of soils is made possible in the USED system. For instance, in the PRA system, the sandy and gravelly soils are confined to the A-1, A-2 and A-3 groups. In the USED system there are eight groups into which the sandy and gravelly soils can be placed. Probably one of the greatest differences between the two systems is the fact that the PRA system indicates that the best soil possible is an A-1 soil which is a well-graded sand-gravel soil with good binder. The USED system indicates that a well-graded gravelly soil (GW) with little or no fines is the best possible soil. (This will classify A-3 in the PRA system). In a way both indications are correct, when it is considered that an A-1 soil makes the best —wearing surface for a gravel road, and a GW soil makes the best soil base for bituminous pavement.

Chart Clarifies Relationship

The average highway engineer has a general idea as to what the PRA soil classification is all about but he likely has only a vague idea as to how this system compares with the USED soil system; and as to how the California Bearing Ratio (CBR) and the modulus of soil reaction "k" vary with the various soil groups. For this reason the accompanying chart has been assembled to give the average engineer a fair idea as to how all these factors tie together.

Obviously a chart of this type cannot be accurate in detail, but rather can show only approximate relationships. The "General Soil Rating" at the top of the chart will be of assistance in obtaining a general idea as to when a soil might be called poor subgrade, good subgrade, good subbase, good base, etc. A "base" is used directly under a bituminous pavement, and a "subbase" is used under the base if the subgrade conditions are poor enough to make such design necessary. Portland cement concrete pavements are frequently placed directly upon the "subgrade as is," but under certain conditions of poor subgrade, a subbase may be placed under the concrete.

The wide range in CBR, "k", and bearing value, for the various soil groups shows that there is a wide difference in the soils within a group even though each group contains soils having similar characteristics. As an illustration, the CBR range for the A-2 soils is indicated from 8 to more than 80. Actually this range might be split into two groups, the A-2 plastic soils ranging from 8 to about 30, and the A-2 friable soils ranging from 30 to more than 80. Likewise, the A-3 soils might be split into two groups with the poorly graded A-3's having a CBR of about 10 to 30, and the well-graded A-3's going from 30 to more than 80.

A fundamental comparison between "bearing value" and "k" is suggested by this chart. The bearing value of a subgrade is the factor used in the adoption of numerous flexible base thickness design formulae. However, since there is no standard method for determining bearing value, and since the value of any subgrade varies greatly with a number of factors, the use of bearing values in these design formulae never has been generally accepted by the engineering profession. In contrast to this, the value "k" is determined by a generally accepted procedure, in which load is applied to a bearing plate 30-in. in diameter, and the penetration of the plate into the subgrade measured. The value "k" is then equal to the load in lb. per sq. in. divided by the corresponding penetration in inches. The U. S. Engineers in concrete design work, use a "k" value calculated at a penetration of 0.05 in. From this discussion it is apparent that indiscriminate use of "bearing values" is a precarious practice. On the other hand, "k" values can be used and discussed with less caution.

In conclusion it can be repeated that the relationships shown on the accompanying chart are very approximate. Actual field and laboratory tests are required to determine "k", "CBR", and "bearing value" for any particular soil.

Idle Used Tractors Needed for Essential Work

A vigorous campaign for placing idle used crawler tractors in essential work through voluntary private sale or rental, Government purchase and sale, and, if necessary, through requisitioning was announced May 29 by the War Production Board. The tractors are needed principally for mining, lumbering, petroleum operators and food production.

As of April 1, 1944, inventory records showed that 26,834 tractors were owned by contractors and distributors, with only 499 available for sale and 905 available for rent. The majority of these used tractors are already at work on essential projects, but it is estimated that 4,000 idle tractors can be located and put to essential use by outright purchase, rental or sub-contract.

New Method for Coloring Maps

An improved process for coloring has been developed by Alston R. Zryd and John A. Gilmont, assistant engineers U. S. Bureau of Reclamation. The method involves the hectograph printing process which, with the use of stencils in a special manner, makes it possible to color maps rapidly and uniformly where printing in less than commercial quantities is required. That the new method is fast is indicated by the fact that maps requiring 25 hours to prepare by hand can be colored in two hours by the Zryd-Gilmont process. The new method, which simplifies a tedious, costly, and time-consuming job, is being made available for use by all agencies of the U. S. Department of the Interior.

Town Control of Billboards

The voters of the Town of Springfield, Vt., at the March meeting passed unanimously a measure prohibiting all advertising signs having an area of over 40 sq. ft. This will not affect business signs on property which pertain exclusively to the property itself, its sale, its rental, or business conducted thereon.

This town action finds its authority in the recent decision of the Vermont Supreme Court which, in upholding the state billboard law, declared that billboards have no inherent right to use the highways for advertising purposes. Pointing out that the billboards are essentially a use not of private property but of the public thoroughfare, the Court declared that if a state or a municipality enacts a law restricting, or even forbidding highway advertising, neither the property owner nor the billboard owner would be deprived of any constitutional rights.

This opinion from a State Supreme Court gives an entirely new angle to the whole business of billboard restriction. In Vermont it gives complete local option to cities, towns and villages, which may enact their own laws for the protection of their roadsides and streets from disfiguring commercial advertising. The Town of Springfield is the first to take advantage of the power granted.

New Trade Literature

HARD-FACING. Many equipment-saving operations through the use of hard-facing are illustrated and described in Stoody Specification Sheets, a copy of which can be obtained by writing Stoody Co., 1125 Slauson Ave., Whittier, Calif. The sheets show closeups of hard-facing applications on many types of heavy equipment, and give recommended hard-facing procedures and proper alloy for each type of application.

▼

"CATERPILLAR" PRODUCTS. A new 20-page booklet published by Caterpillar Tractor Co., Peoria, Ill., illustrates the complete line of "Caterpillar" diesel engines, tractors, and road machinery on earthmoving, agriculture, logging, mining, oil field, and other power jobs.

▼

BULK CEMENT PLANTS. Describing complete bulk cement plants and cement handling equipment, a new bulletin just issued by the C. S. Johnson Company, Champaign, Ill., gives complete details and useful information on this specially engineered equipment.

▼

COMPRESSORS, POWER TAKE-OFFS. A 36-page catalog has been issued by the Davey Compressor Co., Kent, O., illustrating and describing its line of portable compressors, industrial stationary compressors, truck power take-offs and pneumatic saws. Details of the equipment are shown and specifications are given.

▼

"CONSERVATION WELDING" is the name of an informative bulletin made to cut replacement costs, issued by American Manganese Steel Division, American Brake Shoe Company, Chicago Heights, Ill.

Helpful suggestions cover a wide range of welding operations including the repair of tractor sprockets, manganese steel crusher mantles, clamshell bucket teeth, crusher liner segments, manganese steel rock hammers, crusher liner segments, conveyor screws, pusher shoes and many others.

The folder's preachment is that while in normal times it is occasionally cheaper to scrap a worn part, in these days of stringent metal shortages, the welding rod is a valuable friend in need. Ask for Bulletin 344-W.

To clear the way for the mass movement of troops, weapons and supplies to the far corners of the world, Insley Excavators are working the clock around on every front . . . preparing landing strips and port facilities . . . building roads . . . doing many other jobs essential to victory.

So numerous are these jobs, in fact, that all of Insley's expanded production facilities are required to meet the need. That means, of course, that home front demands must take a back seat for the present. But it also means that the contractor who plans his postwar jobs around Insley Excavators will be sitting in the driver's seat because, out of our present experience, will come Insley Excavators that will move dirt cheaper, faster and more efficiently than ever before.

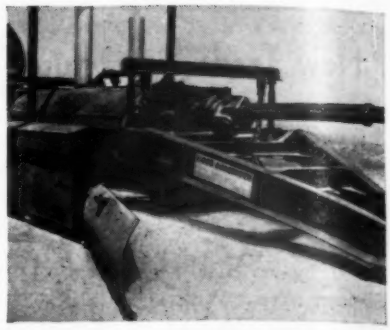
EXCAVATORS • CRANES • BUCKETS • CARTS
INSLEY
CONCRETE PLACING EQUIPMENT

INSLEY MANUFACTURING CORPORATION
INDIANAPOLIS 1, INDIANA

New Equipment and Materials

New Model Wood Roadmixer

Featuring 25 per cent greater mixing capacity, a new Wood Roadmixer known as Model 54 has been announced by Wood Manufacturing Co., 1816 West 5th St., Los Angeles 13, Cal. The Wood plant is in full production on the new model, first units of which have been delivered and are in operation. The increased mixing capacity of the new Wood Roadmixer has been obtained by increasing the diameter of the mixing drum from 48 in. to 54 in. According to Wood engineers, this larger size drum not only cuts down friction resistance within the drum but also enables the handling of larger windrows. Formerly, windrows up to 6 cu. ft. were handled. Now, however, the new Wood Roadmixer can take windrows up to 8 cu. ft. The new machine also features a power lift which, through four hydraulically operated jacks, provide almost instant lifting of the drum and cutting blades, either in the windrow or at the end of the pass. The power lift supplements the manually operated lifts which are used for fine adjustments during mixing. Faster and easier application of cutting blade to grade has been obtained by increasing the size of the plungers on the jacks. In place of a full length axle under the mixer, stub end axles have been substituted. Oversize, single-tired wheels have replaced the dual wheels. Wheels have been moved forward giving a better distribution of weight between tractor draw-bar and wheels. This has also provided a shorter turning radius which allows the mixer unit to get out of and into windrows quicker. Basic operation of the new Wood Roadmixer remains the same.



Closeup of New Wood Roadmixer, Model 54, showing windrowed materials entering mixing drum. Note heavily reinforced tractor, draw-bar and drive shaft to mixing mechanisms

TROJAN

UTILITY PATROL

Does Your Work Dependably, Quicker and at Lower Cost!

● Really advanced design and construction makes this "welter weight" patrol capable of handling all but the heaviest construction jobs, in half the time and for half the money . . . for road and airport . . . maintaining, shoulder trimming, terracing, ditching, snow-and-ice removal. Before you buy a patrol, get the TROJAN story and performance proofs. Address:

CONTRACTORS MACHINERY COMPANY, INC.
Dept. RS-64, BATAVIA, N. Y.
Represented by The International Harvester Industrial Dealer in Your Community

TROJAN ROAD TOOLS INCLUDE: PATROLS, SELF-POWERED SPEED TAMPERS, DRAWN TAMPING ROLLERS, SCRAPERS

Caterpillar Tractor Co. Expands Its Line of Products

Extensive and important additions to its line of products have been announced by Caterpillar Tractor Co., Peoria, Ill., to become effective at such future times as military requirements make possible. Additions to the "Caterpillar" line, which now includes Diesel track-type and wheel tractors, motor graders, Diesel engines and electric sets, will consist of a wide range of sizes and types of earthmoving machines — bulldozers, scrapers, rippers and cable control units—matched both to the current sizes of "Caterpillar" track-type tractors and to the present and future sizes of rubber-tired wheel-type prime movers. The new units will be sold and serviced through "Caterpillar" Distributors and Dealers. The new program is partial departure from "Caterpillar's" past practice of relying upon other manufacturers to produce all of the numerous items of machines and equipment that can be pushed, pulled or otherwise powered by "Caterpillar"-built tractors.

Power Brush for Removing Scale

A portable-tool-driven, steel-bristled brush for removing rust and scale from structural steel has been brought out by The Osborn Manufacturing Co., 5401 Hamilton Ave., Cleveland, O. The brush is of cup shape, approximately 3¼ in. in diameter, heavily-filled with coarse, .020 S.A. wire, the wires extending 15/16 in. out of the cup. Operated in, and driven by, a portable hand tool, the brush spins at 4200 revolutions per minute.

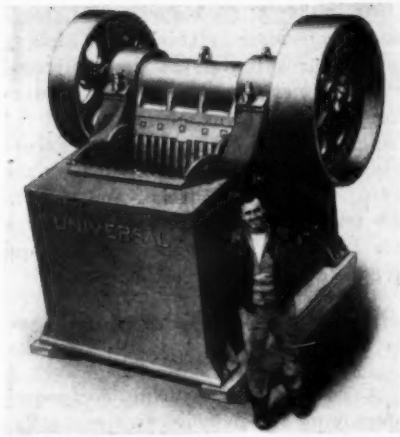
Cleaning rust and scale from structural steel with brush. Below: cup-shaped brush

New Metal Etchers

A new "tool room" metal etcher has been brought out by the Ideal Commentator Dresser Co., 1372 Park Ave., Sycamore, Ill. It is stated to be especially suitable for marking tools, gauges, reamers, dies, punches, jigs, fixtures, etc. Marks numbers, sizes and other important information. The mark is burned right into the surface so that it cannot be worn off through ordinary usage. Depth of mark is controlled by etching heat and speed of writing. Four etching heats are 120, 240, 420 and 700 watts. Outstanding features include red indicating lamp, protected four heat switch, removable hinged cover, terminal tap for "small" 2 ounce etching tool and renewable work plate. All parts are enclosed in a compact, attractive case. In addition to the standard 4 ounce etching tool, a small 2 ounce tool is also available for marking thin delicate parts. Overall size, 7¼ in. x 5⅛ in. x 8½ in., weight 16 lb.

New Welded Steel Plate Jaw Crushers

To its line of steel and semi-steel cast base jaw crushers with roller and bronze bearings, consisting of over 24 sizes, the Universal Engineering Corp., Cedar Rapids, Ia., has recently added a series of welded steel plate roller bearing jaw crushers, designated the "WRB" series. Two sizes are in production and other sizes will be added as conditions permit. One size has a 30 in. x 42 in. feed opening, and the other, and smaller size, has a



New Welded Steel Plate Jaw Crusher

Vital to every advance on the road to Tokyo are the airfields with their runways made carpet-smooth with American equipment.

Prominent in the preparation of these runways are Buffalo Springfield rollers . . . the same rollers that will again serve in peacetime.

BUFFALO SPRINGFIELD ROLLERS

THE BUFFALO SPRINGFIELD ROLLER COMPANY

SPRINGFIELD, OHIO, U. S. A.

20 in. x 36 in. feed opening. Lateral and transverse ribbing and heavy plate side walls impart the structural strength necessary to prevent distortion of frame or misalignment of bearings. Yet there is no excess weight. Four SKF roller bearings are used; two on the pitman and two on the frame, one on each side. Bearings are labyrinth sealed against grit and grease and Alemite lubricated.

New Curing Compound for Concrete

A new concrete curing compound, employing the principles of controlled "yield-point factor," has been placed on the market by the Dewey & Almy Chemical Co., Cambridge 40, Mass. The product is known as Daraseal and it is a blend of hydrocarbon waxes of carefully proportioned molecular weights combined with high polymeric non-waxy materials which inhibit segregation and favor continuity and impermeability of the film. It is specially processed with a solvent to produce a bodied dispersion which is homogeneous and non-settling. Because its "yield point factor," that is its resistance to flow, is carefully controlled, it is claimed that Daraseal can be applied to rough or smooth horizontal and vertical surfaces with the assurance of obtaining a uniform film of any predetermined thickness in a single application. Daraseal meets the A.S.T.M. Federal and State specifications for concrete curing compounds. It can be readily sprayed with the common type of spray gun equipment. Some of the advantages claimed for Daraseal are: It is possible to apply in one operation, protective films of any desired thickness from coverages 50 to 200 sq. ft./gal. It gives a uniform film that is highly resistant to the transmission of moisture vapor and water. It can be used equally well in horizontal or vertical surfaces to give, in a single application a film of any desired thickness. It forms a transparent film that does not discolor the surface.

New Steel Hardening Solution

A new steel hardening solution called Super Temp has been brought out by the Steeltem Chemical Co., 51 E. 42nd St., New York 17, N. Y. It is claimed that the action of this chemical solution on gears, pinions, axles, shafting and other maintenance parts imparts tremendous hardness, thus prolonging their performance and minimizing replacement. It is claimed that the chemical content and thinner base of the new product cause the steel and tools immersed therein to harden more rapidly. Both hardening and drawing are accomplished simultaneously by immersing in the solution. The manufacturers recommend the use of this product for high speed cutting tools that operate with a rotary or uniform motion, for locomotive parts, shovel teeth, well drill bits, hollow drill steel, etc.

New 18-In. Pneumatic Saw

Because of the demand for an in-between size pneumatic saw for contractors' operations, the Davey Compressor Co., Kent, O., has developed an 18-in. tool, which is now available along with 15-and 24-in. models. The saws operate on the same principal as the cross-cut saw, and can be used above or under water. It is stated that with these saws two men can do the work formerly requiring six or eight on timber-cutting jobs. At 225 strokes per minute, it is stated, the saw can cut an 18-in. timber in less than one minute. The operator does not have to support the saw's weight, because an ingenious clamping device, easily operated, carries the weight of the saw, and prevents arm-jerking jolts and uneven cuts. Simplicity of design permits efficient operation even if operated and maintained by inexperienced workers.

Twenty-two REASONS
Why *FLEX-PLANE* Dummy Joints are Necessary in Modern Concrete Pavements

- Reduces the Number of Expansion Joints
- More Dummy Joints Divide Contraction Openings
- Prevents Cracking
- Retards Creeping
- Controls Warping
- Reduces Curling
- Relieves Stress
- Lessens Bumps
- Minimizes Pumping
- Minimizes Panning
- Lessens Deterioration
- Lowest Cost
- Limits Maintenance Cost
- Anchored in Place—Is Permanent
- No Extrusion
- Localizes Expansion and Contraction
- Assists in Normalizing the Slabs
- Ribbon Joint is Continuous in Length
- Prevents Infiltration of Water
- Increases Strength of Slabs
- Produces Homogenous Structure
- Provides Expansion Relief for the Hot Upper Part of the Slab

FLEX-PLANE joint installing machines eliminate messy hand methods. Install all types of joints . . . ribbon, poured, premoulded, etc., with or without VIBRATION.

• *Ask for Equipment Specifications* •

FLEXIBLE ROAD JOINT MACHINE CO. WARREN, OHIO U S A

CORONACH

"Of those immortal dead who live again
In minds made better by their presence."

JOSEPH MCCLINTOCH GARRIS, Manager Sling Division, Macwhyte Co., Kenosha, Wis., died May 25, age 72. Mr. Garris held several basic patents on slings, notable among them his Atlas braided wire rope sling, manufactured by Macwhyte Co. He joined forces with Macwhyte Co. in 1931, and since then has been manager of the sling division. His son, Erwin F. Garris, also widely known, has been his assistant and will carry on in the footsteps of his father.

J. M. Garris

▼

GEORGE M. HUNTER, formerly vice president of American Bridge Co., died May 21, aged 69. He had been connected with the company for 50 years, at the time of retirement 4 years ago.

▼

A. E. PALEN, district engineer for the Public Roads Administration at St. Paul Minn., died last month at the age of 62. He became connected with the Bureau of Public Roads in 1914. He had been in the St. Paul office since 1933. Prior to that he was a graduate in civil engineering from the University of Nebraska and spent a number of years in the Phillipine Islands as a civil engineer.

▼

JOHN J. WICKHAM, member of E. A. Wickham, Bridge Contractors, Council Bluffs, Ia., died last month. He was 68 years old. His company did much railroad construction in the middle west and later constructed a large amount of pavement and other municipal projects in Council Bluffs.

▼

RUSS L. MITCHELL, SR., president of the Russ Mitchell, Inc., Contracting Co., Houston, Tex., died recently at the age of 58. A resident of Houston since 1929, Mr. Mitchell helped construct various army installations, including the Ardmore Army Air Base, Ardmore, Okla., the San Jacinto Ordnance Depot, and Camp Hulen. He formerly served as executive general manager of the Hubbard-Knutson-Mitchell Construction Co.

▼

JOHN B. DEUEL of Worthington, Minn., a contractor engaged in highway construction in Minnesota for over 15 years, died recently at the age of 77. He formerly was a partner with H. S. Thayer, and later was senior partner in the firm of Deuel & Son, which was dissolved in 1942.

▼

CHARLES J. RASCH, former engineer of the Maryland State Roads Commission, died May 22 in Washington, D. C., aged 55. At the time of his death he was construction manager for the George W. Fuller Co.

▼

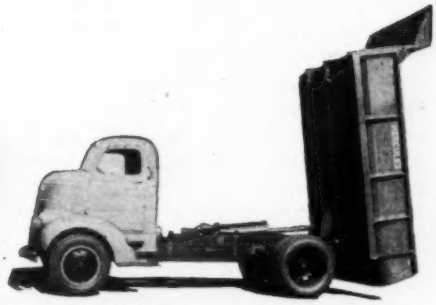
C. K. ORDWAY, district manager for Pioneer Engineering Works of Minneapolis, Minn., died on May 27 of heart failure. He was 51. Mr. Ordway was well known from coast to coast. He had been selling construction machinery for about a quarter of a century. He started with the Northfield Iron Works. In 1922 he went to work for Russell Grader Manufacturing Co. In 1928 he was one of the first salesmen to go on the road for the Pioneer Engineering Works.

HERCULES

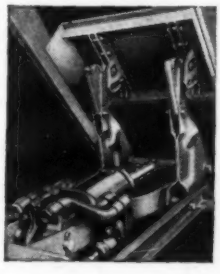
HYDRAULIC HOISTS and DUMP BODIES

GIVE DEPENDABLE SERVICE ON ALL KINDS OF JOBS

Hercules Removable Side Rub Rail Body with hinged rear corner posts. Available in many sizes.



Hercules High Dumper—Power up, power down with 78° dumping angle. Equipped with 12 ton capacity hoist.



HERCULES HYDRAULIC BOOSTER HOIST

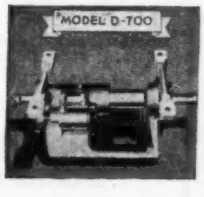
Makes any truck a Dump Truck

Install HERCULES DOUBLE-ARM HYDRAULIC HOISTS under your platform, stake, express or special bodies, which are now idle. Unload the easy way!

This is the Model KXE Hoist, with 6" cylinder, for bodies up to 12 feet long. Body reinforcing plate and steel sills included. Control valve is operated from driver's seat.

USE THE HERCULES SPLIT-SHAFT POWER TAKE-OFF

To operate any truck-mounted equipment



Direct (D-700 Series), Side (D-800 Series) and Dual Drive (B) models are available for operation of almost every possible type of truck-mounted equipment, either singly or in combination.

Recommendations and complete specifications upon request.

HERCULES STEEL PRODUCTS CO.

GALION, OHIO

With the Manufacturers

Ray Morse Appointed Sales Manager for Wood Roadmixer

Ray Morse, for 11 years manager of the Los Angeles Wire Rope Department of Wickwire Spencer Steel Co., has been appointed sales manager of the Wood Manufacturing Co., Los Angeles, manufacturers of the Wood Roadmixer, well known travel plant method of pavement construction. Widely known by equipment distributors and dealers throughout the southwest, Morse will concentrate his activities on the establishing of dealerships for the Wood Roadmixer. Morse's appointment coincides with the introduction this month of a new and larger Wood Roadmixer, first units of which have been completed by the Wood Manufacturing Company.

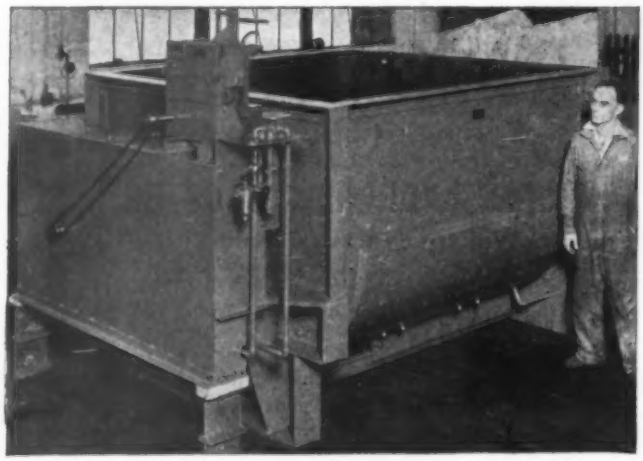
Ray Morse

Cleveland Pneumatic Is 50 Years Old

The Cleveland Pneumatic Tool Co. of Cleveland, O., is marking its 50th anniversary during June. Practically all its peacetime products, which include pneumatic tools, aircraft landing gear, shock absorbers for military rolling stock, rock drills and other mining and construction machinery, are being manufactured for the war effort. Incorporated in Ohio on May 29, 1894, as the Union Electric Co. for the purpose of manufacturing and selling electric appliances, the company had 10 employes and occupied approximately 3,000 sq. ft. of floor space. In 1899 the corporate name was changed to the present one and facilities were concentrated on the development and distribution of pneumatic appliances. During this year the company's first pneumatic riveter and pneumatic chipper were made and marketed. In 1908 a wholly-owned subsidiary for the manufacture of pneumatic mining and construction tools, The Cleveland Drill Co. was organized. During the early stages, company policies of precision workmanship and fair prices were formulated by Claus Greve, its president. He was succeeded as chief executive officer by his son, the late L. W. Greve, who died in 1942, a pioneer in the development of the aviation industry. Oct. 2, 1908, a Canadian subsidiary, the Canadian Cleveland Drill Co., Ltd., was incorporated, which name was changed Sept. 30, 1912, to Cleveland Pneumatic Tool Co. of Canada, Ltd.

W. P. Headden Appointed Assistant Sales Manager

William P. Headden has been appointed assistant manager of the sales engineering department of the Standard Oil Co. of New Jersey. Since early in 1943, he has been supervisor of the fuels and lubricants section of the division. A graduate of Rensselaer Polytechnic Institute in 1929, Mr. Headden joined the Standard Oil Co. at Bayway, N. J. as a student engineer. In 1934, he was moved to 26 Broadway and in 1937 he was promoted to assistant supervisor of the fuels and lubricants sections. Since the outbreak of war he has been devoting much of his time to the solution of lubrication and fuels problems of war industries.



Modernize Your Asphalt Plant by Installing an H & B MIXER

H & B

ESTABLISHED 1867

● H & B Asphalt Mixers are designed and built to give continuous, trouble-free, economical service under the most severe operating conditions. Careful engineering study, backed by nearly fifty years of specialized experience and applied to the suggestions and experience of practical plant operators, insures equipment that is dependable, economical, durable. 15 standard models (both steam and hand operated) ranging in batch capacity from 400 lbs. to the 8,000-lb. giant shown above. Write for literature and prices.

HETHERINGTON & BERNER INC., Indianapolis 7, Ind.

When There's No Time for Breakdowns, It's Time to Get a Gorman-Rupp Pump

Today, when time is the essence, you need a Gorman-Rupp Self-Priming Centrifugal Pump more than ever. There is not a quitter among them. The water passage has the same area as the suction hose. Muck, gravel, cinders—you simply can't clog them because solids cannot accumulate. There is no recirculation orifice to clog—no shut-off valve to jam—no hand priming regulator. There isn't a self-priming centrifugal pump made that will outwork a Gorman-Rupp in gallonage or continuous hours. Gas engine or electric motor driven. Capacities up to 125,000 GPH. There is a type and style to fit your every requirement. Stocked for immediate delivery in 100 principal cities.

THE GORMAN-RUPP COMPANY

MANSFIELD - - - - - - - OHIO

GORMAN-RUPP

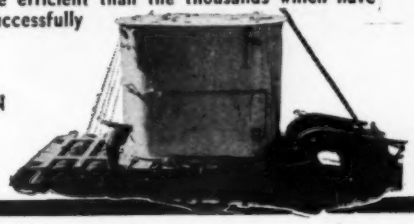
SELF-PRIMING CENTRIFUGAL PUMPS

SAFE from Invasion is no idle boast today. The enemy has been driven from the Alaskan outposts and they dare not attack us here!

ROGERS TRAILERS have played a big part in fortifying our coastlines and they are fighting with our men overseas!

on ROGERS TRAILERS

The ROGERS TRAILERS which will be available to industry when present war contracts are completed, will be even better-engineered and more efficient than the thousands which have been operated so successfully for many years.

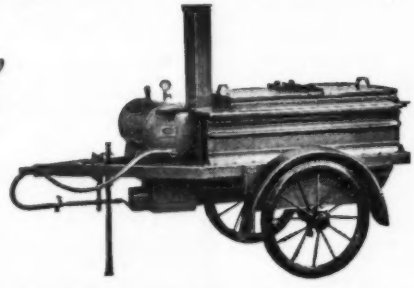


ROGERS BROS. CORPORATION
ALBION,
PENNA.

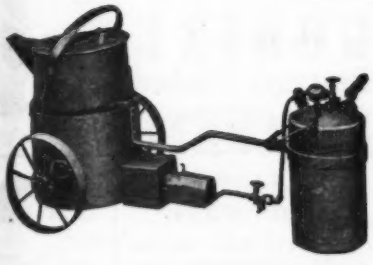
EXPERIENCE *builds 'em* PERFORMANCE *sells 'em*

CONNERY'S HEATING KETTLE

For speedy heating of tar and asphalt—



Use this CONNERY oil-burning Patrol Patching Heater on the *small* job and this CONNERY oil-burning kettle for *large-quantity* production.



Write for catalog showing our full line of tar and asphalt heating kettles, spraying attachments, pouring pots, etc.

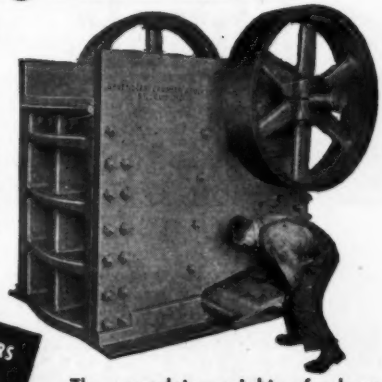
CONNERY CONSTRUCTION Co.
3900 North Second St. Philadelphia, Pa.

GRUENDLER CRAFTSMANSHIP
Serving Industry over 50 Years

150 to 200 Tons Per Hour, Crushing Hard Rock

Steam Shovel rock reduced to 5" to " minus in one operation.

These heavy plate steel constructed roller bearing jaw crushers have tremendous crushing power, take most severe punishment.



The complete weight of above crusher is 54,200 lbs. Size 25x42.

Mfrs. of Portable Jaw or Hammer Crushers and Heavy Roll Crushers
Bulletin mailed on request.

GRUENDLER

CRUSHER *and* PULVERIZER CO.
2915-17 North Market St., ST. LOUIS (6), MO.

Branches. NEW YORK, CHICAGO, PHILADELPHIA BERKELEY, CAL.

THE OWEN BUCKET CO.
Breakwater Ave. Cleveland, Ohio

Shunk

Superior Quality

BLADES AND CUTTING EDGES

For any make of machine Motor Graders, Maintainers, Scrapers, Drags, Bulldozers, Backfillers, Wagon Scrapers, Trail Builders, Trail Blazers, Carryalls. Also—

CUTTING EDGES
WEARING BOOTS
BACK SLOPERS
EXTENSION BLADES
MOLDBOARDS
and
SCARIFIER TEETH

30 years of manufacturing blades has developed for you a special steel, milled through our own rolls and forged at the edges to give that extra wearing quality you need.

All widths lengths, and thicknesses, punched ready to fit your machine.

Consult your internationally recognized Blade Specialists. Write for special bulletins, giving type and name of machines you operate—get set for Blades early.

Shunk

MANUFACTURING COMPANY

Established 1854

BUCYRUS, OHIO,

Member of A.E.D.

DIG and HAUL

. . at low cost

Sauerman Drag Scraper and Portable Gravel Plant

PROFITS in digging and hauling sand, gravel, clay, blasted rock, etc., depend on using the simplest equipment that will handle the required yardage in the shortest space of time.

Often this means using a one-man operated Sauerman Drag Scraper or Slackline Cableway. The Sauerman system of moving materials adapts itself to any ground conditions and provides fast handling on hauls up to 1,000 ft. or more. *Write for Catalog.*

SAUERMAN BROS., INC.

588 S. CLINTON ST., CHICAGO 7, ILL.

The Portland Cement Association announces the appointment of W. Wayne Wallace as District Engineer in charge of its Chicago District Office, effective May 16. He will have charge of Association activities in the State of Illinois with headquarters at 33 West Grand Avenue, Chicago.

W. Wayne Wallace

For the past fifteen years Mr. Wallace has been office and field engineer in Chicago. He joined the Association staff in 1924 and has been continuously employed by the Association since that time with the exception of a three year period when he was engaged in engineering sales work.

He is a graduate of the University of Illinois, Past President of Illinois Society of Engineers, a member of the Western Society of Engineers and the Chicago Engineers Club.

▼

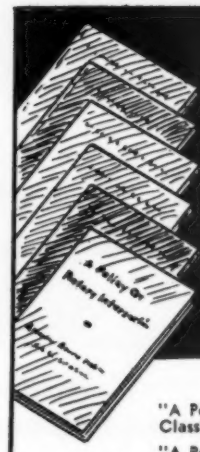
New Distributors for Heil

The Heil Co., Milwaukee, Wis., has announced the appointment of the following new road machinery dealers in the southwest territories: Little Rock Road Machinery Co., Little Rock, Ark.; Dunham and Pugh, Baton Rouge, La.; Fred Berryhill Equipment Co., Lubbock, Tex.; Browning-Ferris Machinery Co., Dallas and Houston, Tex.; Jess McNeel Machinery Co., San Antonio, Tex.; Hardin and Coggins, Albuquerque, N. M.; Clarence L. Boyd, Guthrie and Tulsa, Okla. Leland Equipment Co., Tulsa and Oklahoma City, will continue to represent The Heil Co. on truck bodies and hoists. The Heil line includes a complete range of newly designed bulldozers, trailbuilders, hi-speed cable scrapers, and hi-speed bottom dump wagons.

▼

Mack Makes 4 Major Sales Appointments

Four major sales department appointments have been announced by F. F. Staniford, president of Mack-International Motor Truck Corp. E. F. Vreeland, formerly district manager of the Bronx and White Plains, N. Y., has been named manager of the Albany, N. Y., branch in Mack's Northeastern Division. M. J. Chollet has been appointed district manager of the St. Louis Mo., branch, while C. L. McLure now heads the Louisville, Ky., branch. Cone T. Bass meanwhile has taken over duties as division bus manager of Mack's Central Division.



6 ACCEPTED PAMPHLETS on . . HIGHWAY POLICY

"A Policy on Highway Classification" $0.50
"A Policy on Rotary Intersections" ..... .50
"A Policy on Sight Distance for Highways" ..... .50
"A Policy on Intersections at Grade" .50
"A Policy on Highway Types (Geometric" ..... .50
"A Policy on Criteria for Marking and Signing No-Passing Zones on Two and Three Lane Roads" ..... .50

or $1.50 for the set of six

The accumulated knowledge and experience of highway engineers and officials are condensed for you in these essential works. A complete set should be on your desk.

AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS

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NATIONAL GUNITE Pressure-Packed CONCRETE has superior advantages:

Low water ratio assures density at all points—no voids, no bubbles or air pockets . . . Waterproof —perfect steel protection. . . . Greater strength with less thickness... No waste of material... Great savings in time.

Recommended for rebuilding or relining disintegrated concrete and steel as well as new work.

National Gunite is a coast-to-coast engineering organization with years of experience, supplemented by field crews of skilled Gunite operators.

Write, giving your requirements

NATIONAL GUNITE CORPORATION

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Boston Washington

Truckstell Manufacturing Co. Incorporated

Announcement has been made of the incorporation at Cleveland, O., on May 31st, of the Truckstell Manufacturing Co., a stockholder distributor organization consisting of approximately 40 national distributors of truck equipment, Don Meyer and Milt W. Anderson, founders of the company and other nationally known transportation experts. At the meeting plans were laid for the development and manufacture of new equipment and for expansion of facilities to handle additional lines of manufacturers needing the service of such a national distributor organization. Present lines now distributed include: Eaton 2-speed axles; Thornton 4-rear wheel tandem drives; Thornton automatic locking differentials; Truxmore third axles; Clark heavy duty axles; Clark booster engine conversions; Clark heavy duty cast wheels; Watson auxiliary transmissions and Champion safety gas tanks. Donald W. Meyer is president of the newly incorporated company and Mr. J. D. Maynard of Detroit; C. A. Bieber of Cleveland and Walter Blaul of Chicago are vice presidents directing the various committees. F. J. Hessler of Cleveland is secretary-treasurer. Milton W. Anderson is chairman of the board, which consists of: L. N. Ross of Portland, Ore.; Neil Schilling of Memphis, Tenn.; John Groenier of Chicago, Ill.; J. D. Maynard of Detroit, Mich.; L. Howard Wilcox of Pittsburgh, Pa.; S. C. Olson of Minneapolis; C. H. Smyth of Boston, Mass.; W. J. Boggs of Kansas City, Mo.; and Donald W. Meyer.

▼

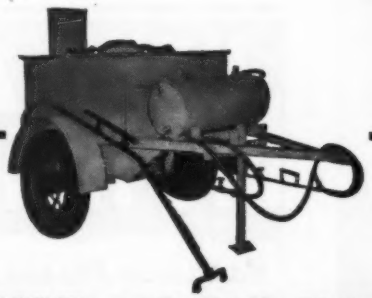
J. E. Underwood New Research Director for Diamond Alkali

J. M. Avery, Vice President in charge of research and development of Diamond Alkali Co. has announced the appointment of J. E. Underwood as Director of Research. Mr. Underwood will be located at the Diamond Research Laboratories at Painesville, Ohio.

▼

Searight Becomes Sole Owner of Western Cataphote Co.

William H. Searight, vice president of the Western Cataphote Co., Toledo, O., has become sole owner of the business with the purchase of the half interest held for years by Charles T. Harther, president. The company has been in business since 1930, when it started as an affiliate of the Libbey Glass Company. In 1930 the business was acquired by Mr. Harther and Wm. Searight and its name changed to Western Cataphote. The company does an extensive highway and other sign business, and manufactures reflecting house numbers.



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FIRE PROOF—OIL BURNING
Hand and Motor driven spray.
Many sizes. Write for catalog.

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START PAVING EARLY...

Make best use of available

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- TANKCARS
- MATERIALS
- TIME
- MONEY
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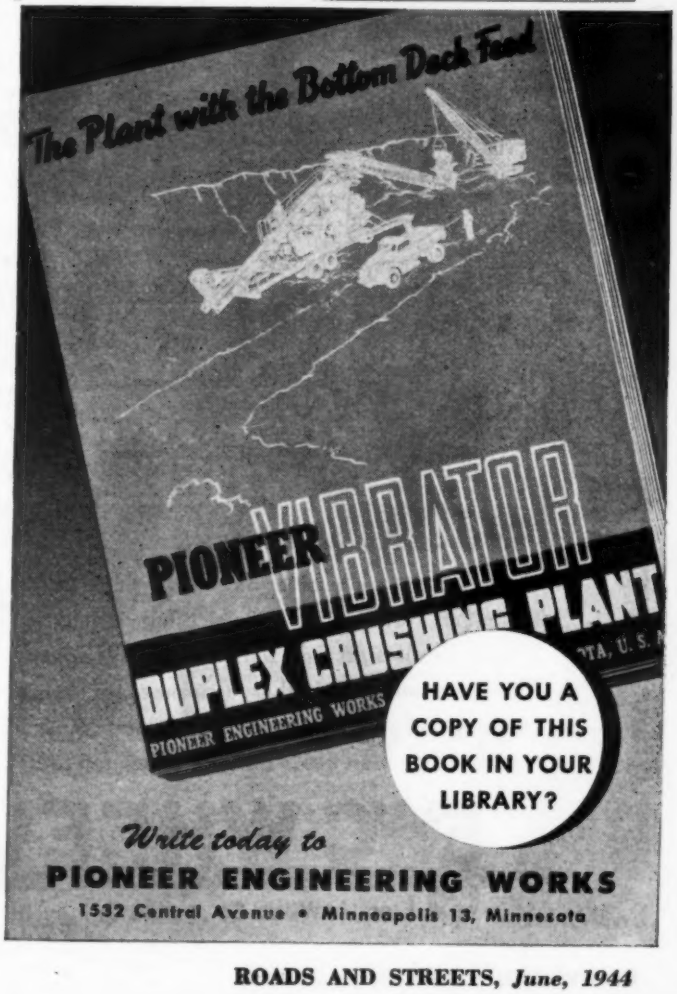
WITH STANOLIND ASPHALT

KEEP TRAFFIC ROLLING

STANDARD OIL COMPANY (INDIANA)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PIONEER VIBRATOR
DUPLEX CRUSHING PLANT
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ERIE TRUCK MIXER PLANTS

Erie builds a complete line of central concrete plants to keep truck mixers on the move.

Consult Erie now for the most modern of Post-war Plants.

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PICK-UP STREET SWEEPERS

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STREET FLUSHERS
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BITUMINOUS DISTRIBUTORS
BITUMINOUS MAINTENANCE UNITS

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Since 1908

MUNICIPAL SUPPLY COMPANY - SOUTH BEND 23, INDIANA

SAVE 50% ON FUEL AND WAITING TIME

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HEAT AND MELT TAR, PITCH, ASPHALT

TWICE AS FAST

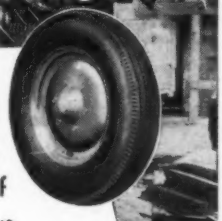
AEROIL "HEET-MASTER"

Complete outfits on skids or wheels, capacities 30, 80, 110 and 165 gallons. Larger units can be obtained with hand sprays. Send for FREE BULLETIN No. 260S. For full information of concrete curing machines, tool and surface heaters, asphalt tools and accessories, etc. Write for FREE Catalog No. 240RS.
NEW cleaning and degreasing tanks and sprayers to keep equipment in condition (Bulletin 270RS).

AEROIL BURNER CO., INC.
5711 PARK AVE. WEST NEW YORK, N. J.
Branches: Chicago, San Francisco, Dallas

PRESTO

There's Another DISC WHEEL for You!



Pictured above is a view of one of our huge Hydraulic Fast Traverse Presses, which turns out Disc Wheels of all sizes and varieties at high speed. This equipment is further assurance to you of quality Wheels at economical cost. Write us today for Illustrated Bulletins and full details.

EWC WHEELS

Electric Wheel Co., Dept. RS Quincy, Ill.

LeTourneau Appoints Backus As Engineer

Thomas Backus, formerly chief engineer for the Fuller Manufacturing Co., at Kalamazoo, Mich., has been appointed chief engineer for R. G. LeTourneau, Inc. Mr. Backus, already established at the Peoria, Ill., headquarters of R. G. LeTourneau, Inc., now has complete charge of LeTourneau designing detailing, equipment testing and maintenance of quality. Prior to his Fuller affiliation, Mr. Backus was with General Motors, Willy-Overland, Spicer Manufacturing and Clark Equipment companies. He attended the University of Rochester, in New York, and has long been a member of the Society of Automotive Engineers.

Tom Backus

Named Vice-President of Raybestos-Manhattan, Inc.

Robert B. Davis, General Manager of the Raybestos Division, Bridgeport, Conn., was elected a vice-president of Raybestos - Manhattan, Inc., by the directors of the corporation following the 16 annual stockholders' meeting held at the Biltmore Hotel, New York City. Mr. Davis joined Raybestos in 1915 as a sales representative and was promoted to the position of sales manager in 1923, and general sales manager in 1932. His appointment as general manager was made in 1939.

R. B. Davis

NEED A BIG Trailer?

La Crosse Makes Them Up To 200 Ton Capacity

** WRITE OR WIRE **

LA CROSSE TRAILER & EQUIPT. CO.
LA CROSSE, WISCONSIN U.S.A.

Carey Names Production Head

The Philip Carey Mfg. Co., Cincinnati, O., has announced the appointment of C. B. Pooler as vice president in charge of manufacturing. The Carey Co. operates nine plants in the United States and Canada. Born in Fort Dodge, Ia., Mr. Pooler has spent practically all of his life in the building material industry. An electrical and mechanical engineer, he has served as production manager, plant manager, division operations manager, manager of labor relations plants producing fabricated steel metal lath, insulating board, roofing, paints, paper, asbestos and gypsum products.

C. B. Pooler

New Alaskan Dealer for Madsen

Madsen Iron Works of Huntington Park, Calif., has appointed the Lomen Commercial Co., Seattle, Wash., as distributors in Alaska and the Yukon Territory for the complete line of road construction equipment. The line includes portable asphalt paving plants, oil-mix plants, travel-mix machines, cement finishers, batching plants, rubber tired rollers, and other construction equipment. This announcement is in keeping with the Madsen postwar plans to distribute nationally through established equipment dealers.

Marion Holds Sales Meeting

The Marion Steam Shovel Co., Marion, O., recently held it annual sales meeting with the entire Marion sales force attending. Recent developments by the company, as well as its postwar plans, were discussed, followed by an open forum in which each member of the Marion sales oragnization discussed his respective territory.

LOOKING AHEAD?

Include

TUTHILL GUARD RAILS

in Your Plans

IN facing the future and planning your Postwar Highway Safety Program, be sure to face the facts about why it will pay you to specify TUTHILL—the GUARD RAIL that stands straight as a sentry wherever installed.

TUTHILL *stands up*, and keeps *standing* for two valid reasons: First, it is struck less. Its convex surface is seen quicker, more clearly, at longer distances and under all weather conditions. Secondly, it is damaged less when struck. Its deflective action prevents serious damage. It saves more lives, permits less damage.

Standing—erect—trim—sentinel-like—undamaged—TUTHILL proves it withstands strains and stresses where they mean most, namely, *in actual service! Write for detailed specifications.*

Pacific Coast Manufacturers and Distributors
U. S. SPRING & BUMPER CO., LOS ANGELES, CALIF.

TUTHILL SPRING COMPANY
761 POLK ST... CHICAGO 7, ILL.

STRENGTH

... to finish whatever it starts.

... to rip through toughest going.
... to ram the dipper deep into the bank.
... to resist twisting and fracturing.
... to absorb shock loads.
... to pile up profits for you.

WHEN THE WAR IS WON

Byers will offer you new, improved, faster mobile cranes and shovels for peacetime jobs.

BYERS CRANES AND SHOVELS
RAVENNA, OHIO
DISTRIBUTORS THROUGHOUT THE WORLD

For SEAL COATING and ICE CONTROL with fewer men at less cost

The **FLINK** *Spreader*

The Flink self-feeding spreader is strictly a one-man outfit. Operated by driver of cab, who can throw spreader into action as he rapidly approaches, crosses and leaves intersection. Then it can be thrown out of action. Flink spreads forward or backward, full width of street, or less than half width. Handles sand, cinders, etc., up to 1" in size, wet or dry, spreading evenly up to 35' width. Does not limit use of truck for other purposes as Flink spreader fits on end as a tail gate. Positive agitation, no bridging. Flink spreader will pay for itself many times over the first year in labor saved, in extra yardage covered and reduction of complaints.

The **FLINK CO.,** STREATOR, ILLINOIS

For particulars write our nearest representative:

WICO SALES
2924 N. Western, Chicago 18, Illinois

G. W. CLEMENTS
3050 Freemont St., Columbus 4, Ohio

C. R. HANSON
2303 Grand Ave. Kansas City, Mo.

TULSA MACHINERY CO.
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NORTHLAND DE LUXE EQUIPMENT CO.
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TRANSITS and LEVELS

New or Rebuilt
Sale or Rent

Headquarters for REPAIRS — any make. Factory Service. We will also *buy* your old instruments or take them in *trade*.

A complete line of Engineering Instruments and Equipment for Field or Office. Write for Bulletin RS-96.

WARREN-KNIGHT CO.
Manufacturers of Sterling Transits and Levels
136 N. 12th St. Philadelphia 7, Penna.

FOR SALE

Blaw-Knox clamshell bucket with the following specimens:
Size No. 743-2RN, rated 3¾ cubic yards, serial No. AA-1917, Blaw-Knox heavy duty round nose dredging bucket with alloy scoops, chrome nickel molybdenum steel cutting lips, Manganese steel corner bar pins and bushings, and with standard excavating teeth. The lips are suitable for attachment of different types of rock handling teeth. (Blaw-Knox Drawing No. 93080).
The bucket weighs, bare, 17,300 pounds and is equipped with the seven drop forged chrome nickel steel digging teeth, weighing 1,150 pounds, making a total bucket weight of 18,450 pounds. The bucket is in our yard at Harvey, Louisiana (across the river from New Orleans).

FOR SALE

ERIE STEAM CLAM ¾ YARD NO. 1012 in good shape. One 5 ton roller like new. Box 120, Roads and Streets, 330 S. Wells St., Chicago 6, Ill.

FOR SALE

Universal Combination Level-Transit. First class condition. For information and price write McIntire Lumber Company, El Dorado, Kansas.

TIRE REPAIRS

In all sizes of tractor, truck, wheelbarrow, passenger or 1800x24 tires.
An Equa-Flex "Sectional" repair constructed in your tire is guaranteed. Best results and prompt service!
It is a fact that we do repair run flat tires, passenger and truck, without a reliner!

WALLACE TIRE SERVICE, Inc.
2320 S. Michigan Ave. Chicago, Ill.

VULCAN PAVEMENT AND CLAY DIGGING TOOLS

ARE MADE in a complete line of sizes to fit all standard compressed air hammers.

Send for NEW Vulcan illustrated CATALOG today.

VULCAN TOOLS — THE WORLD OVER — NOTED FOR QUALITY AND DURABILITY"

VULCAN TOOL MFG. CO.
QUINCY, MASS.

FOR SALE BY OWNER

6 Super C LeTourneau Tournatrailers, Trailer Model W10A.
2 Model C LeTourneau Tournatrailers, Trailer Model W10A.
4 Athey Track Wagons 11 Cu. Yd.
2 Athey Track Wagons 10 Cu. Yd.
3 Athey Track Wagons 16 Cu. Yd.
2 Model W LeTourneau Scrapers (1800x24 Tires).
1 Model E LeTourneau Scraper.
1 Model J LeTourneau Scraper.
6 Super C Tournapulls, Cummins Diesel Engines.
1 Caterpillar 48" Diesel Driven Elevating Grader.
1 Woods Bituminous Travel Plant with 2,500 gallon Tank Trailer and Tractor Power Takeoff Unit.
1 Pioneer 30x42 Jaw Crusher, Electric Motor, V Belt Drive, Receiving Hopper, Pioneer Oro Feeder, 4'x10' Single Deck Screen, 261' 36" Belt Conveyor with Goodyear 6 Ply Belt, Air Compressor and Receiver, all necessary Electric Motors, Controllers, Grids, Control Stations, Fuse Boxes, and Signal System.
1 Model B Fuller-Kinyon Cement Unloader.
1 Model C Fuller-Kinyon Cement Unloader.
1 Fuller Rotary Electric Driven Compressor, 360 C.F.M. @ 45#, Type C-70.
1 American Hoist & Derrick Steel Stiffleg Derrick, 85' Boom, 15 Ton Capacity with Steam Hoist.
1 Ten Ton Traveling Steel Erection Derrick, 100' Boom with 18' Extension, 35' Mast, 35' Sills, complete with either Steam or Electric Driven Hoist.
2 Rex No. 200 Double Pumpcrete Units, Electric Driven, with Remixers and 2,000 Lin. Ft. 8" Line and Accessories.
2 Chicago Pneumatic Compressors, Model N. S. B., 750 C.F.M. @ 30#.
1 Ingersoll-Rand Compressor, Type XRB, 870 C.F.M. @ 105#, with 150 H.P. Electric Motor and Motor Controls.
1 Ingersoll-Rand Compressor, Type XB, 1,300 C.F.M. @ 100#, with inner cooler and 200 H.P. Electric Motor and Motor Controls.
1 Ingersoll-Rand Compressor, Type 10, 1,400 C.F.M. @ 35#, with 150 H.P. Electric Motor and Motor Controls.
(The above compressors are supplemented by all the necessary Valves, Line, Fittings, Pressure Regulators, and Accessories to equip a pneumatic caisson installation).
4 Rex 2 Yd. High Discharge Transit Mixers mounted on 1942 Model KS6 International Trucks.
1 Blaw-Knox 1½ Yd. Transit Mixer mounted on 1940 Chevrolet Truck.
1 Johnson One-Stop 3 Compartment Cement Aggregate Bin with 700 bbl. Cement Storage, Bucket Elevator and Transfer screw.
All items subject to prior sale.

PETER KIEWIT SONS' CO.
Omaha, Nebraska
1024 Omaha National Bank
Phone: Jackson 2052
Seattle, Washington
1403 West 45th Street
Phone: Hemlock 7800

RELIANCE

CRUSHING, SCREENING and WASHING UNITS

● Up to 2000 Tons a Day ●

Crushers	Bins	Drag-Lines
Elevators	Pulverizers	"GAYCO"
Sweepers	Feeders	Centrifugal
Screens	Spreaders	Air Separators
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	Conveyors	

UNIVERSAL ROAD MACHINERY CO.
Kingston, N. Y.
Canadian Representatives: F. H. Hopkins & Co., Ltd. 340 Canada Cement Co., Montreal, Que., Can

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EXCEPTIONAL BARGAINS
IMMEDIATE SHIPMENT

FOR SALE:
1—Barber-Greene Hot Asphalt Plant
1—Barber-Greene Bituminous Finisher
1—Barber-Greene 44C Ditcher
1—Barber-Greene 82A Bucket Loader

FOR RENT:
522 Barber-Greene Pneumatic Tired Bucket Loader—Gasoline Power.

PAUL L. MATCHETTE COMPANY
Exclusive Distributors for Barber-Greene Co.
Missouri — Kansas — Oklahoma
20 West 9th Street, Kansas City, Mo.

GASOLINE ENGINES

We have the following gasoline engines on hand ready for immediate shipment, subject to prior sale. All rebuilt motors are in exceptionally good condition. Write for details and prices:
5 new R-33 Red Seal Continentals, 115 h.p.
4 new B-427 streamlined Continentals, 90 h.p.
1 K-428 Buda, 90 h.p.
2 K-428 Budas, 90 h.p.
1 used R-33 Red Seal Continental, 115 h.p.
1 used R-32 Red Seal Continental, new crank shaft, bearings, rings.
1 used PE-383 Continental, 80 h.p., LM.
1 PE-383, used, 80 h.p., new crank shaft, bearings, and rings, F.
1 PE-383 used Red Seal Continental, HM.
4 PE-383 used Red Seal Continentals.
1 PE-383 used Red Seal Continental, No. 203.
1 Waukesha, 6-110, new shaft, bearings, and rings.
3 PE-383, used, good condition, Continentals.

IOWA PORTABLE MILL COMPANY
George Lonien Jim Crowley
Phone 111, Oelwein, Iowa, Dept. "R"

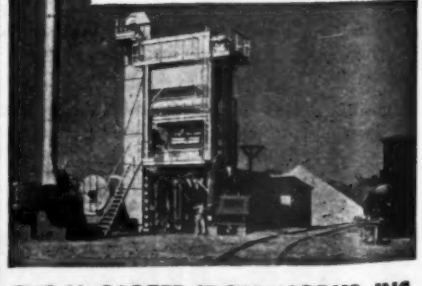
FOR SALE

1 Monagan Dragline, 70 ft. boom, 3½ yd. bucket in A-1 condition. 1 30-B Bucyrus Steam Shovel. Located in western Kentucky. Box 130, Roads and Streets, 330 S. Wells St., Chicago 6, Ill.

POSITION WANTED

By middle aged construction man, 25 years' experience as supt. and foreman on all classes of city and highway paving, heavy and fine grading, sewers s?????? and air posts. Understand blueprints. Sober and dependable. References. Box 140, Roads and Streets, 330 S. Wells St., Chicago 6, Ill.

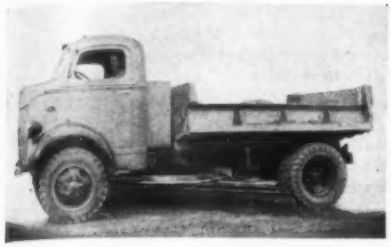
PORTABLE ASPHALT PLANTS
High Production—Low Cost



THE McCARTER IRON WORKS, INC.
NORRISTOWN, PENNA.

ROOT MODEL-F33 SCRAPER

FOR GRAVEL ROAD MAINTENANCE



The ROOT MODEL F-33 SCRAPER gets to the root of all gravel road maintenance problems. It provides a trowel-smooth finish and aids drainage because it leaves a clean shoulder devoid of sod. It is speedy, easily adjusted to all types of gravel road surfaces. Its sturdy trouble-free construction has won for it the preference in the gravel road maintenance field.

Write for Bulletin F-33

ROOT SPRING SCRAPER CO.

Kalamazoo, Michigan

Builders of road maintenance equipment since 1890

J. E. Mayl Heads Goodyear's Tire Sales Division

J. E. Mayl, vice president of The Goodyear Tire & Rubber Co., Inc., Los Angeles, Calif., has returned to Akron, O., as the head of the company's Tire Sales Division. Reporting to Mr. Mayl in his new capacity will be the company's five division sales managers and the following three men: C. C. Osmun, who has been appointed manager of trade relations with full responsibility for the company's trade relationships in the tire industry as well as with government

C. C. Osmun

Victor Holt

rationing and pricing agencies. Victor Holt, former assistant manager of the tire department, who now heads that organization will have under his supervision, automobile, truck and tractor tires and petroleum sales and service department activities. D. R. Mackenroth, manager of the retail stores division, will include associated merchandise in his new assignment. Manager of associated merchandise, including car and home supplies, battery and brake department, is H. G. Harper and Carl Crafts, former manager of the dealer department, is now manager of the retail stores.

▼

Le Tourneau Now Lists 29 New Distributors

Appointments under the new R. G. LeTourneau, Inc., exclusive distributors' policy are now well over half way toward the intended number, with a total of 29 retail firms included to date. The latest new distributor list released by LeTourneau includes: Hunter Tractor & Machinery Co., Milwaukee, Wis., Dempster Bros. Inc., Knoxville, Tenn.; The Crook Co., Los Angeles, Calif.; Contractors Machinery Co., Grand Rapids, Mich.; J. E. Ingram Co., San Antonio, Tex.; Phillippi-Murphy Co., Minneapolis, Minn.; Pacific Hoist & Derrick Co., Seattle, Wash.; Florida Equipment Cos. of Jacksonville, Tampa and Miami, Fla.; Cyril J. Burke, Detroit, Mich.; Phillips Machinery Co., Richmond, Va.; Contractors Equipment & Supply Co., Atlanta, Ga.; Landes Engineering Co., Salt Lake City, Utah; Gibson-Stewart Co., Cleveland, O.; Conley-Lott-Nichols, Dallas, Tex., and Rozier-Ryan Co., St. Louis, Mo.

▼

H. C. Steiner New Manager Goodyear—Australia

Howard C. Steiner has been appointed managing director of the Goodyear Tire and Rubber Co. (Australia) Ltd., with headquarters at Granville, New South Wales. He succeeds W. G. Wither, former managing director of Goodyear—Australia, who has resigned because of ill health.

▼

C. W. Pearson Appointed Plant Superintendent

Clarence W. Pearson has been appointed plant superintendent of Rodgers Hydraulic Incorporated, Minneapolis, according to an announcement made by John L. Rodgers, President. Pearson was formerly connected with the Twin Cities Ordnance Plant as General Superintendent of the 30 calibre Ammunition Department. He came to Minneapolis eight years ago, and for the past three years has been at the Ordnance Plant.

▼

L. C. Welch Elected Director Standard Oil of Indiana

L. C. Welch, Assistant General Manager of Sales in charge of the lubricating and Sales Technical Service Departments of Standard Oil Company of Indiana, has been elected to membership on the Board of Directors at the annual meeting of stockholders at Whiting. Stockholders also re-elected ten other directors and authorized the Board to fill one remaining vacancy at its discretion.

YOU CAN'T GO WRONG

If you buy a BURCH TRUK- PATROL, because it is an all-year-'round machine, doing the winter as well as the summer jobs. Moving slush and ice from paved roads, road and shoulder maintenance, cleaning shallow drainage ditches and many others. And, remember, it is HYDROMOTOR controlled.

Manufactured by

The BURCH CORPORATION

Crestline, Ohio

Equipment since 1875

Don't forget, BUY BONDS

▼

A. M. Guthrie Appointed Field Sales Manager for Buckeye

A. M. Guthrie has been appointed field sales manager of The Buckeye Traction Ditcher Co. with headquarters at Findlay, O., the company's home office. He will be in charge of distributor policies and appointments through district managers. Mr. Guthrie had been Buckeye's Eastern District Manager at Philadelphia, Pa., since January, 1940. Prior to joining The Buckeye Traction Ditcher Co. he was associated with the Paul Cochran Equipment Co. in Chicago, and before that with the R-B Equipment Manufacturing Co. of Royal Oak, Mich.

A. M. Guthrie

Break it Up *Fast!*

WITH

"GJ-BOSS"

GROUND JOINT

AIR HAMMER COUPLINGS

Designed and built to assure long, uninterrupted service, with maximum safety, on drills, hammers, spades and other pneumatic tools. Ground joint feature provides permanent soft-to-hard metal seal that cannot leak; also eliminates the time and trouble required for washer replacements. "Boss" Interlocking Clamp exerts a powerful grip that is proof against blowoffs.

Compact Type, Style XLB-61, ½" and ¾". Heavy Type, Style XHB-72, ¾" and 1". For washer type, specify "Boss" Air Hammer couplings.

Stocked by Manufacturers and Jobbers of Mechanical Rubber Goods

DIXON
VALVE & COUPLING CO.
Main Office and Factory: **PHILADELPHIA, PA.**
BRANCHES: CHICAGO · BIRMINGHAM · LOS ANGELES · HOUSTON

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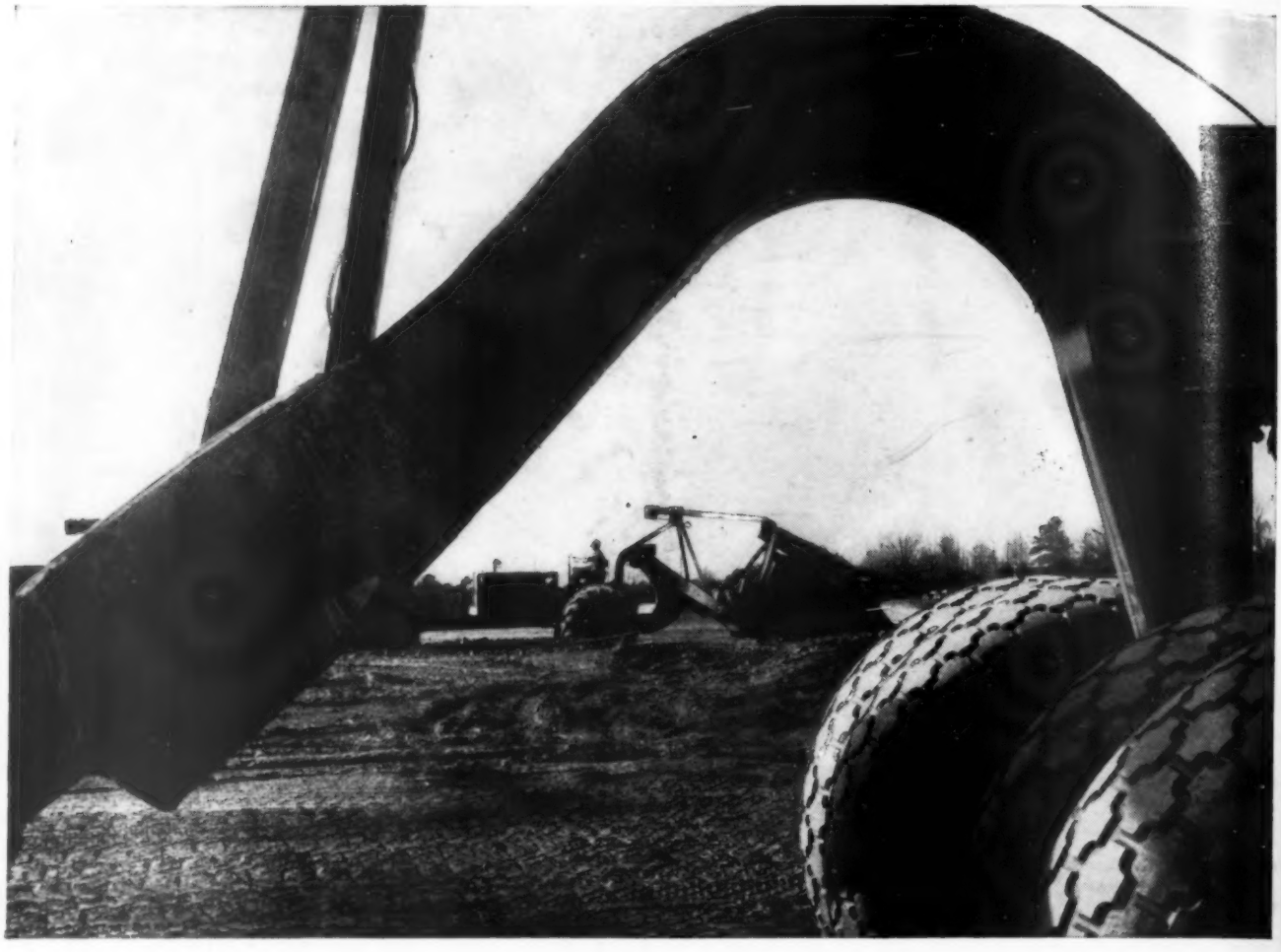

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